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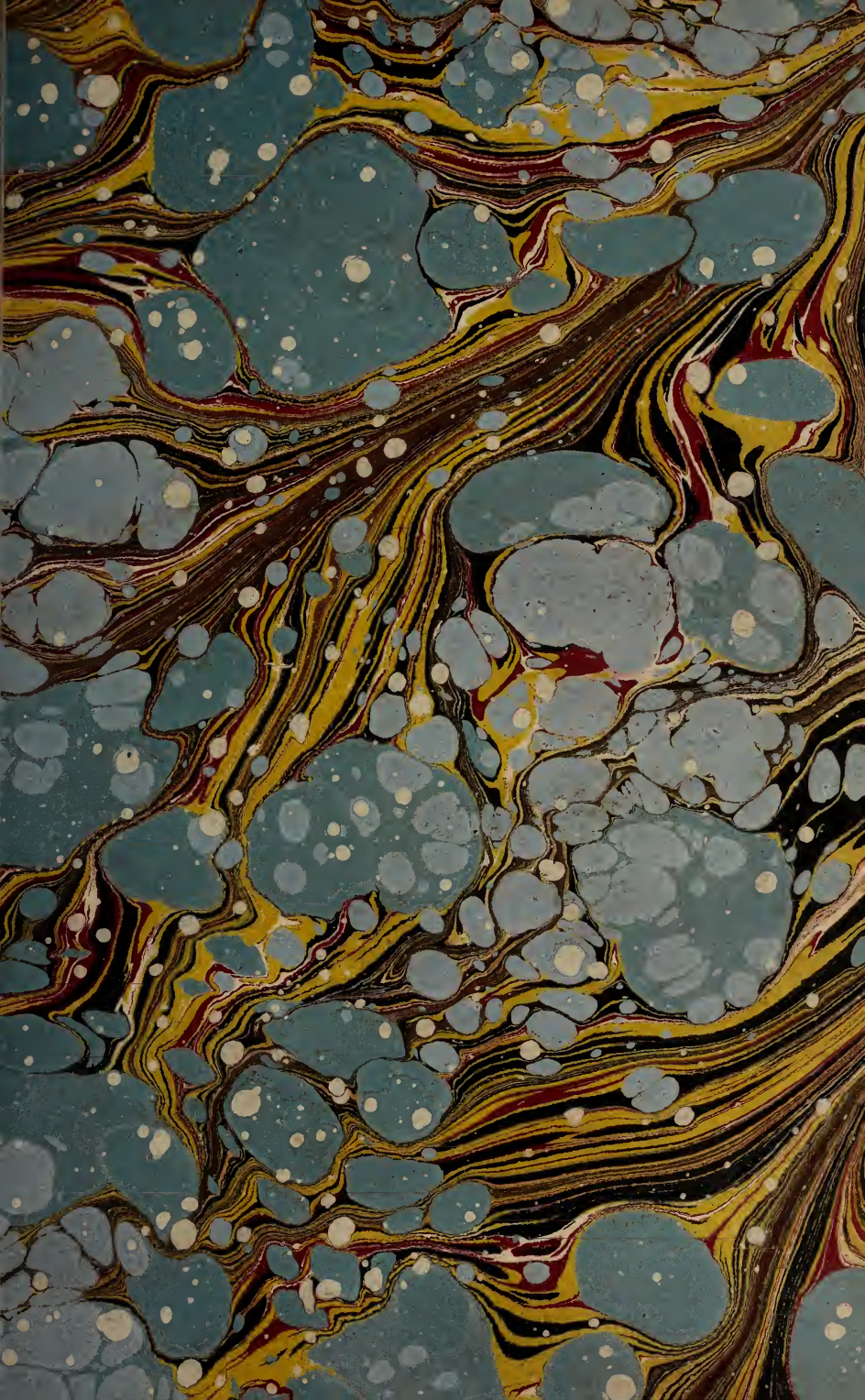
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# Grevillea,

A QUARTERLY RECORD OF  
CRYPTOGAMIC BOTANY  
AND ITS LITERATURE.

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EDITED BY M. C. COOKE, M.A., A.L.S.,

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## PREFACE.

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TWENTY years since, with some anxiety and no little hope, I commenced this Journal, wholly on my own pecuniary responsibility, and as the sole director of its destinies. At that time I felt strong in the co-operation of my old friends, the Rev. M. J. Berkeley, the Rev. C. Kalchbrenner, and the Rev. W. A. Leighton, all of whom have since gone over to "join the great majority." After this long interval I have considered it advisable to transfer the duties and responsibilities to other and younger hands, but without severing my interest, or withholding from it the use of my pen. It is with feelings of pleasure and confidence that I resign the editorial chair to my friend and colleague, Mr. George Massee, and I feel sure that my subscribers will see in this an earnest of no decadence in interest or value, and a sufficient cause for appealing to them for continued and increasing support. It is unnecessary to offer further reasons or apology for the course which I have thought fit to take than have already been offered. I might urge that after being twenty years under the control of one individual, a change would probably be an advantage to any journal, especially when the antecedents of the new director give such good promise. As I bid farewell to my official connection, it is with a feeling of pride and satisfaction that I acknowledge the success of my venture, in one essential point, in which failure is not uncommon, that there has always been a small balance of receipts over expenditure. It has not been a "valuable literary property" in the business acceptation of that phrase, but it is some consolation that a scientific journal could be conducted for twenty years without pecuniary loss, although I have never taken the best advantage of the facilities it afforded for lack of leisure to devote myself to the proprietary interest as well as the editorial.

I desire to claim no especial merit for the work I have done or attempted, but will rest content to leave that to be appraised by those who have benefited by it. Still, I should not be willing to make my bow and retire without an expression of thanks to all those who have assisted me, without fee or reward, in filling up these pages from year to year. It would be invidious to name some and exclude others, so that I will simply refer to the names of such writers as appear in each annual index as indication of the persons to whom my thanks are tendered.

I have been assured that it is not intended to make any material alteration in this Journal, either in form or contents, and the sequence will remain unbroken. For my successor I have only to solicit the same forbearance as I have received, and an increased, and ever increasing, measure of generous support, with which I take my leave.

M. C. COOKE.

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## SPECIES OF HYDNEI.

ADDITAMENTA TO SACCARDO'S SYLLOGE.

### **Hydnum peroxydatum**, *Berk.*

Crassum, effusum, arcte adnatum, ferrugineum vel peroxydatum; aculeis obliquis, pendulis, stalactiformibus, crassiusculis, subconfertis, ad basim connatis, rectis, longiusculis (2 m.m.) obtusis.

On trunks. Venezuela, 134.

### **Hydnum analogum**, *Berk. in Herb.*

Subiculo effuso, subvillosus, sulphureo. Aculeis sparsis, paucis, cylindraceis, gracilis, pulverulentibus (1-9 m.m. long), flavidis.

On rotten wood. Neilgherries, India.

### **Hydnum Liriodendri**, *B. & C. in Herb.*

Does not appear to differ specifically from *Hydnum Halei*.

### **Hydnum artocreas**, *Berk. & Curt. in Herb.*

Coriaceum, effusum, margine elevato, limitato, purpureo-fusco, sublibero, canaliculato; aculeis ochroleucis, prælongis, deorsum in areolas connatis, sursum obtusis, totis farinaceis.

On trunks. Venezuela, 139.

A most distinct and characteristic species, five or six inches long.

### **Hydnum cohærens**, *Berk. & Curt.*

Niveum, subiculo membranaceo, chartaceo, tenui, adnato, ambitu flocculoso. Aculeis subulatis, gracilibus, acutis, hinc illic in plagas transversos confertis, ceteris nudis.

On bark. Venezuela, 133.

### **Hydnum scariosum**, *B. & Br.*

Resupinatum, membranaceum, cervinum, sæpe confluens (1-10 c.m. long), margine libero, sterili. Aculeis brevibus, minutissimis, gracilis, acutis, conspersis, concoloribus.

On bark. Ceylon, No. 162.

Apparently the description was inadvertently omitted from the "Fungi of Ceylon."

**Hydnum microdon**, Pers. *Fr. Syst. Myc.* i. 147. *Klot. H.C. Myc.* 1918, *ed nova* 133.

Omitted from Saccardo Sylloge.

**Hydnum luteo-virens**, Cesati.

From Pedrotallagalla.

Appears to be an *Irpea*.

**Hydnum Berkeleyi**, Curtis. (*Ravenel* 963).

We fail to trace description.

**Hydnum albiceps**, B. & Rav. *Herb. Berk.*

As far as the United States specimens are concerned, this does not appear to be distinct from *H. membranaceum*. The Ceylon specimen seems quite different.

**Hydnum herbicolum**, Ellis MSS.

On stems of *Phytolacca*. (No. 3865.)

Is this described?

**Hydnum trechodontium**, Berk. in *Herb. Rav. Fun. Car.* III. 20.

On oak logs. *Ravenel*, 1296.

Doubtless a form of *H. mucidum*.

**Hydnum (Resup.) lachnodontium**, Berk.

Albidum. Subiculo latissimo, papyraceo, primum flocculoso, niveo, margine villosa; aculeis prælongis, acicularibus, plerumque ad basim compressis, flaccidis, inæqualibus, acutis (2-3 m.m. longis).

On logs, etc. Neilgherries, India.

**Hydnum Ayresii**, Berk. in *Herb.*

Subiculo crustaceo, tenui, effuso, umbrino, margine indeterminato, velutino, pallescente. Aculeis confertissimis, subulatis, brevibus, acutis, sæpe deorsum compressis, vel confluentibus.

On bark. Mauritius.

There is another species from Venezuela in *Herb. Berk.* under the name of *Hydnum uncinatum*, but the specimens are small and may be immature, or, at least, are hardly satisfactory for description.

## RADULUM.

Of the species of *Radulum* not included in Saccardo Sylloge may be mentioned :

**Radulum spongiosum**, Berk. *Hook. Journ.* 1854, p. 163.

Eastern Nepal.

**Radulum thelephoroides**, Berk. in *Herb.*

= *Thelephora hydnoidea*, Schwein.

**Radulum pini-canadensis**, Schwein. *Fungi Amer.-Boreali* No. 595.

**Radulum hydnans**, Schwein. *Fungi Amer.-Boreali* No. 596.

**Radulum investiens**, Schwein. *Fungi Amer.-Boreali* No. 597.



**Radulum taurinense**, *de Notaris in Herb. Berk.*

This is an authentic specimen from Notaris, but where described is unknown to us.

**Radulum Emerici**, *Berk.*

Resupinatum, adnatum, suborbiculare vel confluens, alutaceum, margine albido. Hymenio initio poroso, demum dentato, dissepimentis tenuibus, acutis.

On logs. Neilgherries, India.

**Radulum Neilgherrensis**, *Berk. in Herb.*

Primum velutinum, demum subglabrescens. Hymenio pallide violaceo-cervino, margine sterili, tomentoso; dentibus brevibus, obtusis.

On logs. Neilgherries, India.

PHLEBIA, *Fries.***Phlebia spilomea**, *Berk. & Curt.*

Effusa, orbicularis vel confluens, adnata, membranacea, ambitu pallido, byssino, hymenio purpureo, plicis radiantibus, minimis, demum papillatis.

On bark. Venezuela, S. Carolina, Iowa.

**Phlebia deglubens**, *Berk. & Curt.*

Effusa, adnata, ambitu libero, recurvo, subtus pallido; hymenio rufescente, plicis intricatis, meruliæformibus, dein subpapillatis, ceraceis.

On trunks. Venezuela.

**Phlebia arachnoidea**, *B. & C. (Venezuela).*

The specimens are too uncertain for description.

To the above must be added also:

**Phlebia coccineo-fulva**, *Schwein. Fungi Amer. Bor., p. 165, No. 603.***Phlebia hydnoidea**, *Schwein. Fungi Amer. Bor., p. 165, No. 604.*

The latter has been referred to *Odontia lateritia*, B. & C., which may be correct as far as the single authentic specimen is concerned.

**Odontia albominiata**, B. & C., which seems to be also *Hydnum cinnabarinum*, Schwein., has been referred to *Odontia lateritia*, B. & C., but this we conceive to be an error.

**Odontia scopinella**, *Berk. Sacc. Syll. 6825*, is not a *Hydnum*, as described, but *Odontia*, to which genus Berkeley afterwards transferred it in his herbarium.

**Kneiffia tinctor**, *Berk. in Herb.*

Tota resupinata, tenuis, effusa, læte alutacea, subtus matricis rufo-tincta, margine indeterminato, granulis minutis.

On rotten wood. Venezuela, 151.

**Kneiffia subtilis**, Berk. in Herb.

Tenuis, effusa, membranacea, mycelio niveo, arachnoideo enata, tota albidā, margine indeterminato, granulis minutis, hinc illic aggregatis.

On wood and branches. Venezuela, 155, 156, 157. New Zealand, 160.

**Kneiffia typhæ**, Berk. in Herb.

This is *Corticium typhæ* forma *hydnoidea*.

## AUSTRALIAN FUNGI.

By M. C. COOKE.

(Continued from Vol. XIX., p. 92.)

**Strobilomyces ligulatus**, Cooke.

Pileus convex, hemispherical (10 c.m. diam.), brown, clad with darker ligulate scales, composed of parallel threads (7-8 m.m. long), often recurved at the extremity. Stem (12 c.m. long, 2 c.m. thick) striate, with a few scattered fibrils, paler, rather attenuated upwards. Tubes long, shortened behind, angular, yellowish, or with a reddish tint. Spores brown, elliptical,  $20 \times 10 \mu$ .

On the ground. Victoria. (Martin, 832.)

**Strobilomyces fasciculatus**, Cooke.

Pileus hemispherical, convex, reddish-brown (8-10 c.m. diam.), squamulose, the fascicles of strap-like scales parting into large pentagonal areolæ. Stem nearly equal (8-10 c.m. long,  $1\frac{1}{2}$  c.m. thick), even, paler. Tubes elongated, free behind, mouths angular, yellowish. Spores elliptical, pale brown,  $10-12 \times 5 \mu$ , flesh turning bluish when cut.

On the ground. Victoria. (Martin, 777.)

**Hypocrella axillaris**, Cooke.

Stroma obturbinate or obclavate, seated in the upper axils (5 m.m. long, 2-3 broad), black, opaque, minutely granular with the ostiola; substance white. Perithecia very minute, immersed in the periphery. Asci cylindrical,  $120 \mu$  long. Sporidia filiform, at length multiseptate (about  $100 \mu$  long), hyaline.

On grasses. Brisbane. (F. M. Bailey, 897, 898.)

Somewhat resembling *H. bambusæ*, but larger and less globose. Size and form not unlike *H. strangulans*, Mont. Upon more mature consideration both these appear to have greater relationship with *Hypocrella* than with *Epichloë*.

**Phyllachora maculata**, Cooke.

Stroma gregarious on bullate tawny spots of the living leaves ( $1\frac{1}{2}$ -1 c.m. broad), black, semi-immersed. Asci clavate. Sporidia elongated, elliptical, a little narrowed to each end, hyaline,  $22-25 \times 8 \mu$ .

On leaves of *Eucalyptus*. Victoria. (Mrs. Martin, No. 9.)



**Dothidella inæqualis**, Cooke.

Stroma erumpent, then subsuperficial, on both surfaces, nearly orbicular (about 2 m.m. diam.), black, shining, with three to five elevations corresponding to the cells. Asci clavate, octosporous. Sporidia cylindrically elliptical, with one septum about one-fourth the length, dividing the sporidium into two unequal cells, one of which three times the length of the other ( $20-24 \times 6 \mu$ ), pale amber colour.

On dead leaves of *Eucalyptus*. Victoria. (Martin, 824.)

Some cavities contain stylospores which are elongated, fusiform, curved, acute at both ends, 3-5 septate ( $50-55 \times 3 \mu$ ), hyaline.

**Montagnella rugulosa**, Cooke.

Epiphylla vel hypophylla. Stromate tenui suborbiculari (1 m.m. diam.), atro, depresso, rugoso, loculis polyascis. Ascis clavatis. Sporidiis lanceolatis, triseptatis, dilute olivaceis,  $20 \times 6 \mu$ .

On leaves of *Eucalyptus*. Victoria. (Mrs. Martin, 705, 745.)

**Physalospora microsticta**, Cooke.

Perithecia scattered, on both surfaces, innate, punctiform, globose, black with a papillate ostiolum. Asci cylindrical. Sporidia uniseriate, elliptical or almond shaped, continuous, hyaline,  $14-16 \times 8 \mu$ .

On dead phyllodes (?). Victoria. (Mrs. Martin.)

**Trabutia parvicapsa**, Cooke.

Innate; perithecia on brown elliptical spots, on both surfaces, convex, rather crowded, small, black, somewhat shining, numerous. Asci clavate, tetrasporous or octosporous. Sporidia lanceolate, rounded at the ends, continuous, granular within, hyaline,  $35-40 \times 10 \mu$ . Whole contents of the perithecia with a pink tinge.

On phyllodes of *Acacia*. Victoria. (Mrs. Martin, 774.)

Besides the difference in the sporidia, this differs from *T. phyllodiarum* in the much smaller and more numerous perithecia.

**Anthostomella Lepidospermæ**, Cooke.

Perithecia seated on bleached elongated spots which have a dark brown border, globulose, at first covered, then splitting the cuticle. Asci shortly stipitate. Sporidia elongated-elliptical, biseriate, rounded at the ends, continuous, clear brown ( $14 \times 4 \mu$ ).

On *Lepidosperma*. Victoria. (Mrs. Martin, 781.)

**Sphærella cryptica**, Cooke.

On both surfaces of the leaves. Spots reddish-brown, large, irregular or confluent. Perithecia subglobose, immersed in the substance of the leaf, with scarcely any indication of their presence. Asci obpyriform or obclavate, sessile. Sporidia lanceolate, uniseptate, not constricted, hyaline,  $10 \times 3 \mu$ .

On fading leaves of *Eucalyptus*. Victoria. (Mrs. Martin, 753.)

**Dimerosporium parvulum**, Cooke.

Perithecia minute, subglobose, membranaceous, with a brown sparse radiating mycelium, seated on irregular black spots (in

company with *Asteromella*). Asci globose, with a small basal apiculus. Sporidia elliptical, uniseptate, constricted at the septum, hyaline,  $11-20 \times 8 \mu$  (possibly acquiring colour when mature).

On living leaves of *Trema aspera*. Zandina, Queensland. (Bailey, 902.)

***Asteromella epitrema*, Cooke.**

Spots on the upper surface, black, somewhat orbicular or confluent, bearing a mycelium of brown jointed threads. Perithecia minute, subglobose, membranaceous, seated on the mycelium. Sporules numerous, somewhat fusiform, or narrowly elliptical, continuous, guttulate, hyaline,  $10-12 \times 3 \mu$ .

On living leaves of *Trema aspera*. Zandina, Queensland. (Bailey, 902.)

In company with *Dimerosporium parvulum*.

***Piggotia substellata*, Cooke.**

On the under surface, forming small somewhat orbicular stellate black patches (1-2 m.m. diam.), composed of the confluent, flattened perithecia, which are sometimes distinct, seated on rather larger tawny spots. Sporules cylindrical, straight, obtuse at the ends ( $8 \times 1 \mu$ ), hyaline, on longer simple basidia.

On leaves of *Eucalyptus*. Victoria. (Mrs. Martin, 744.)

***Leptothyrium aristatum*, Cooke.**

Perithecia scattered, superficial, scutate, orbicular, submembranaceous, radiately cellular, dark brown ( $\frac{1}{10}$  m.m.). Sporules cylindrical, strongly curved, obtuse at the ends, with an oblique hyaline bristle at one end, equal in length to the sporule, hyaline,  $14-15 \times 2-3 \mu$ .

On dead leaves of *Eucalyptus*. Victoria. (Mrs. Martin, 752.)

***Stagonospora orbicularis*, Cooke.**

Forming small orbicular pallid spots (5 m.m. diam.) on either surface, circumscribed by a brown line. Perithecia few (3 to 5) in the centre of the spots, covered by the cuticle, which is at length cracked, globose depressed, black. Sporules fusiform, acute at the ends, curved, 3-5 septate, constricted at the septa, hyaline,  $60-70 \times 8 \mu$ .

On dead leaves of *Eucalyptus*. Victoria. (Mrs. Martin, 740, 768.)

***Stilbospora foliorum*, Cooke.**

Epiphyllous. Pustules on orbicular paler spots, splitting the cuticle, with three or four orifices, through which the sporules escape. Stroma flattened, conidia broadly elliptical, a little narrowed towards each extremity, three septate, not constricted, olive brown, becoming nearly opaque ( $22 \times 8-9 \mu$ ).

On dead leaves of *Eucalyptus*. Victoria. (Mrs. Martin, 132.)

***Strumella patelloidea*, Cke. & Mass.**

Stroma orbicular, patelloid, scattered, superficial, black (1-1½ m.m. diam.), conidia subglobose or ovate, continuous, dark olive (7-8  $\mu$  diam.), on short sporophores.

On naked wood. Tasmania. (Martin, 789.)

Similar in fruit to *S. hysterioidea*, but quite different in habit and appearance.

## BREFELD'S "MYKOLOGIE."\*

Mycological works, in German, have a most limited circulation in this country, and our Teuton friends are very much mistaken if they think that any amount of effort on their part will materially increase it. Some expressions of disappointment have reached us that German works, many of them excellent, meet with so limited a sale, and such small encouragement in Britain. It should not be forgotten that mycologists are very limited in number in these islands, and some of these are unable to purchase indiscriminately expensive works in any language, whilst the number capable of perusing German with ease is considerably less. All those capable of reading and appreciating Dr. Brefeld's works, for instance, could be counted on the fingers of one hand. Up to the present nine parts have been issued, and the combined cost is £9 7s., and a tenth part is announced at twenty-six shillings. Alas, the purchasers, at ten guineas, of German Mycological works, with analytical figures, however beautifully executed, would scarcely be flattering, if a census could be ascertained.

We may add a brief summary of the general contents of the nine parts.

Part I. contains *Mucor mucedo*, *Chaetocladium Jonesii*, and *Piptocephalis Freseniana*, with remarks on the Zygomycetes.

Part II. is in illustration of *Penicillium*.

Part III. contains the first part of the Basidiomycetes, with observations on *Coprinus stercorarius*, *C. lagopus*, *C. ephemerus*, *C. ephemeroides*, *Amanita muscaria*, *Agaricus melleus*, and generally on Gasteromycetes, Clavariæ, and Tremellini.

Part IV. Methods of culture.

Part V. is devoted to the Ustilagineæ.

Part VI. includes Myxomycetes and the Entomophthoreæ.

Part VII. The second portion of the Basidiomycetes, principally the Tremellini.

Part VIII. The third portion of the Basidiomycetes.

Part IX. on Exoascus, and the first part of the Ascomycetes.

\* "Untersuchungen aus dem Gesamtgebiete der Mykologie." Von Dr. Oscar Brefeld. Heft. ix. Die Hemiasci und die Ascomyceten. Munster, 1891.

Part X., when issued, will contain a continuation of the Ascomycetes.

The entire ten parts will contain 90 quarto lithographic plates, including many hundreds of figures, and certainly very finely executed, but not comprehensible without the text, and therefore appealing only to the student, educated well up to the point. Taking the last part issued as an example, we cannot say that we think 60 pages of German and 4 plates, for sixteen shillings, offers any special inducement in an age of cheap books. If it should be argued that there existed no intention of producing a cheap book, but an indispensable one, which from its originality would command a sale at any cost, then it may be retorted, we think, that there are no specialists in this country, to whom the work is indispensable, who have not already obtained it, but, if there should be one or two still destitute, all the parts can be obtained through the ordinary channels of trade.

## NEW BRITISH FUNGI.

By M. C. COOKE.

(Continued from Vol. XIX., p. 86.)

### **Kalmusia stromatica**, Cke. & Mass.

Stroma eutypoid, effused, elevated, black, perithecia immersed, with distinct prominent ostiola, asci clavately cylindrical. Sporidia elongated, fusiform, 4 to 7 septate, not constricted, brown,  $30 \times 6 \mu$ .

On decorticated branches, near Oxford. (Baxter.)

Resembling somewhat *Kalmusia eutypoides*, but sporidia different.

### **Coryneum camelliæ**, Massee.

Epiphyllous, on irregular large bleached spots, limited by a dark margin. Pustules gregarious on the spots, splitting the cuticle in a linear, triangular, or irregular manner. Sporules lanceolate, ( $30 \times 10 \mu$ ), with two to four coloured median cells, and a hyaline triangular apical and basal cell, seated on sporophores of about equal length.

On living *Camellia* leaves. Kew.

It is possible that this is only *Pestalozzia Guepini* with the terminal awns suppressed, but technically it is a *Coryneum* in the present condition.

### **Ramularia petuniæ**, Cooke.

Epiphyllous. Spots large, orbicular or irregular, ochraceous. Conidia cylindrical, rounded at the ends, continuous, then uniseptate, hyaline ( $20-22 \times 4 \mu$ ), on short basidia, sometimes covering the entire leaf, and destructive.

On leaves of *Petunia*. Plymouth.



## SPECIES OF CYPHELLA.

BY M. C. COOKE.

To the species of *Cyphella* must be added the following, not included by Saccardo :—

**Cyphella venustula** (*Desm.*), *Peziza venustula*, *Desm. Ann. Sci. Nat. Ser. II. Pl. Crypt.* 1058. *Sacc. Syll.* VIII., 1770.

On *Acer negundo*.

**Cyphella syringæ** (*Wallr.*), *Peziza syringæ*, *Wallr. Rabh. F. E.* 32. *Sacc. Syll.* VIII., 1768. *Peziza velutina*, *Desm. Pl. Crypt. No.* 17.

On *Syringa*, etc.

**Cyphella Tiliæ** (*Peck*), *Peziza tiliæ*, *Peck. Sacc. Syll.* VIII., 1771.

On *Tilia*.

**Cyphella inconspicua** (*B. & C.*), *Peziza inconspicua*, *B. & C. Sacc. Syll.* VIII., 1788.

Sporules elliptic,  $8 \times 5 \mu$ .

**Cyphella fumosa**, *Cooke*.

Gregaria, stipitata, fumosa et nigrescens. Cupula ( $1-1\frac{1}{2}$  m.m. diam.) membranacea, cyathifornia, flexuosa, deorsum in stipitem brevem attenuata, extus intusque lævi; sporis subglobosis ( $4 \mu$  diam.).

On rotting leaves of *Gladiolus*. S. Carolina (*Ravenel*, 3071.)

**Cyphella virgultorum**, *Cke. & Rav.*

On vine twigs, Okra, etc.

Cannot well be distinguished from *C. capula*.

**Cyphella discoidea**, *Cooke in Grev.*

Omitted from Saccardo Sylloge. New Zealand.

**Cyphella fuscospora**, *Currey in Herb.*

Sparsa, sessilis, minuta ( $\frac{1}{4}-\frac{1}{5}$  m.m.) extus alba, tomentosa, intus flavescens, margine connivente. Sporulis fuscis, subglobosis vel subellipticis, punctulatis vel granulato-echinulatis (8-10  $\mu$  long).

On bark. Weybridge.

**Cyphella Australiensis**, *Cooke*.

Gregarious, cup-shaped, sessile ( $1-1\frac{1}{2}$  m.m. diam.), pallid, clad with closely pressed silky hairs; margin connivent, disc honey coloured. Sporules  $4-5 \times 3 \mu$ .

On bark. Melbourne (*Berggren*, 378.)

**Cyphella texensis**, *Berk. & Curt. in Herb.*

Cupulata, sessilis, pallida ( $1-1\frac{1}{2}$  m.m.), demum applanata, discoidea; extus pilis subrugosis ornata. Sporis ellipticis, majusculis.

On *Quercus*. Texas (*Wright*, 3779.)

**Cyphella fissilis** (*Fr.*), *Berk. in Herb.* *Cantharellus fissilis*, *Fr. Syst. Myc.* I., 324.

On the authority of Rev. M. J. Berkeley this is a *Cyphella*, distinct from *C. lacera*.

**Cyphella arborum**, *Fries*.

There is a specimen from Leveille under this name in Herb. Kew, but we know not where he has described any species under that name.

## NOTES ON CLAVARIEI.

BY M. C. COOKE.

**Clavaria (Holocoryne) Muelleri**, Berk.

Simple, clavate, white, slender (2-3 c.m. long), attenuated below into a thin cylindrical stem, apex obtuse.

On the ground. Victoria, Queensland.

**Clavaria tuberosa**, Sow. t. 199. Berk. & Br. Ann. Nat. Hist. No. 1448. *Calocera tuberosa*, Sacc. Syll.

This was determined by Berkeley to be a *Clavaria*, allied to *C. ardenia*. Spores 10  $\mu$  long.

**Clavaria Tasmanica**, Berk. in Herb.

Clubs simple, clavate (4 c.m. long), single, or two or three together, fuliginous, base expanded in a white floccose mycelium. Stem slender, paler, somewhat flexuous; spores sub-globose, 8  $\mu$  diam.

On tree ferns, wood, etc. Tasmania.

**Calocera divaricata**, Berk. Hook. Journ. 1842, p. 140, with fig. Possibly *Pterula divaricata*, Lev. Sacc. Syll. VI., 643.**Calocera rubra**, Berk. & Cooke. Fungi Brazil, 344. *Clavaria*, Sacc. Syll. 8113.

Always intended to have been described as a *Calocera*, but by contraction of the generic name to an initial, it has been mistaken for *Clavaria*.

**Calocera merismatoides**, Schwein. *Pterula*, Sacc. Syll. No. 7203.

We have already expressed an opinion as to the insertion of *Lachnocladium* in this family instead of *Thelephorei*, in which latter Berkeley always placed it.

Berkeley adds to this genus:—

**Lachnocladium flagelliforme**, Berk. *Clavaria flagelliformis*, Berk. Sacc. Syll. 8010.**Lachnocladium dilatatum** (Mont.), Berk. *Clavaria dilatata*, Mont. Sacc. Syll. 8150.**Lachnocladium delicia**, Berk. *Clavaria delicia*, Berk. Sacc. Syll. 8014.**Lachnocladium dealbatum**, Berk. *Clavaria dealbata*, Berk. Sacc. Syll. 7998.

We take this opportunity of repudiating the insinuation that we are animated by any personal feeling, or ambition, in our notes or suggestions for the rectification of Saccardo's Sylloge. Our sole desire has been that in a future supplement to that work additions and corrections might be made with a view to its greater perfection and utility.

**Lachnocladium Kurzii**, *Berk. in Herb.*

Nigrescens (3 c.m. alt.) erectum, dense cæspitosum, ramosissimum, gracile, rigidum; ramulis cylindraceis, ultimis tenuibus, subobtusis, compressis.

Ad terram. Java (*Kurz.* 558).

**Lachnocladium rubiginosum**, *Berk. & Curt. in Herb.*

Rubiginosum, breviter stipitatum (8 c.m. alt.), ramosissimum, cylindraceum, dense velutinum; ramis repetito-dichotomis, ramulis ultimis subulatis acutis.

On trunks (?). Venezuela 218.

The pubescence is caused by rigid brown setæ, like those of *Hymenochæte*.

**Lachnocladium Hookeri**, *Berk. Sacc. Syll.* 8176.

There is no such species; Berkeley afterwards stated (*Fungi Ceylon*, No. 673) that the specimens described under this name were *Clavaria formosa*, P.

**Acutis gigantea** (*Schwz.*), *Sacc. Syll.* 7928.

This is evidently spurious, both as to genus and species. Berkeley demonstrated in *Gardener's Chronicle*, March 18, 1878, that the *Clavaria gigantea* of Schweinitz was only a malformation of *Lentinus tigrinus*, Fr.

## NOTES ON THELEPHOREÆ.

By M. C. COOKE.

**Hymenochæte episphæria** (*Schw.*). *Telephora episphæria*, *Schwein. Amer. Bor.* No. 723.

Spores olive, elliptical,  $8 \times 5 \mu$ . Setæ smooth, slender, brown.

**Hymenochæte Kunzei** (*Fr.*), *Mass. Mon.* p. 100. *Stereum Kunzei*, *Fries.*

British Guiana, Venezuela, Brazil.

**Hymenochæte barbata**, *Mass. Mon.* p. 109.

Ceylon.

**Hymenochæte Kalchbrenneri**, *Mass. Mon.* p. 116.

New Zealand, Australia.

**Hymenochæte nigrescens**, *Cooke, Mass. Mon.* p. 104.

Carlisle, G.B.

**Hymenochæte pallida**, *Cke. & Mass. in Mass. Mon.* p. 97.

Mexico.

**Hymenochæte scruposa**, *Mass. in Herb. Berk.*

Effused, rugose, scrupose, tawny umber, margin flexuous, becoming free and floccose, paler. Cystidia numerous,  $80-90 \times 15 \mu$ , bright brown. Spores,  $7 \times 4 \mu$ .

On bark. Venezuela.

**Hymenochæta tuberculosa**, *Cooke Grev.* ix., 101. *Mass. Mon.* p. 112. Brazil. Glaziou, 12332.

**Hymenochæta tasmanica**, *Mass. Mon.* p. 105. *St. rubiginosum*, *Berk.* Tasmania.

**Peniophora lilacina** (*Schw.*), *Mass. Mon.* p. 147. *Thelephora lilacina*, *Schw. Amer. Bor.* No. 680.

**Peniophora occidentalis**, *E. & E. in Ellis N.A. Fungi* No. 2314.

**Corticium apalum**, *B. & Br. Journ. Linn. Soc.* xiv., 72. *Asterostroma apala*, *Mass. Mon.*

**Corticium Berkeleyi**, *Cooke, Rav. Fung. Amer.* 225. *Ellis N.A.F.* 934. *Massee Mon.* p. 133.

On pine logs. U.S.

**Corticium compactum**, *B. & Curt. in Herb.*

Broadly effused, indeterminate, ochraceous white, tuberculate, rigid. Hymenium smooth.

On bark. Pennsylvania, No. 6025.

**Corticium carbonaceum**, *B. & Curt. in Herb.*

Wholly effused, thin, papyraceous, becoming black. Hymenium smooth. Spores elliptical,  $5 \times 3 \mu$ .

On bark. Venezuela, No. 286.

**Corticium debile**, *B. & C. Mass. Mon.* p. 131.

On wood. Venezuela.

**Corticium ceraceum**, *B. & Rav. in Rav. Fungi Amer.* 453. *Rav. Car. Exs.* III. 29. *Cort. molle*, *B. & C. Ellis N.A.F.* 607. *Cort. armeniacum*, *Sacc. Syll.* 7665.

**Corticium Lycii** (*Pers.*), *Grev.* ix., 95. *Massee Mon.* p. 122.

Europe.

**Corticium lacunosum**, *B. & Br. Ann. Nat. Hist. Fr. Hym. Eur.* 661.

Aboyne.

**Corticium penetrans**, *C. & M. Grev.* xix., p. 90.

Victoria.

**Corticium radicale**, *Hook. Journ.* 1845, p. 59.

Australia.

**Corticium rubi** (*Lib.*). *Thelephora Rubi*, *Lib. Pl. Cry. Ard.* 323.

**Corticium rubicola**, *Berk.*

Pennsylvania. = *C. ambiens*, *B. & Br.*

**Corticium rigescens**, *B. & Curt. in Herb.*

Broadly effused, closely adnate, rigid, white, cracking or becoming porose when dry, here and there, especially at the margin, turning brownish by exposure of the darker substratum.

On wood, etc. Venezuela, 186, 187, 118, 191.

**Corticium elevatum**, *B. & C.*

Pennsylvania.

Stratose, no hymenium. Probably a morbid *Poria*.



**Corticium foetidum**, B. & Br. *Ann. Nat. Hist.* 1879. *Massee Mon.* p. 131.

Coed Coch.

**Corticium bupleuri**, Roum. *Fungi Gall. No.* 1804. *Corticium Friesii*, Grog. *Rev. Myc. t. IV.*, p. 19. Roum. *Fungi Gall. No.* 2509. France.

**Corticium graminicolum**, E. & M. N. Amer. *Fungi No.* 1717. On *Andropogon*. N. Jersey.

**Corticium reticulatum**, B. & C. *Grev. I.*, 180. *C. tremellinum* var. *reticulatum*, B. & C. N.A. *Fungi No.* 272. Pennsylvania.

**Corticium liquidambaris**, B. & C. *Massee Mon.* p. 148. Alabama.

**Corticium spumeum**, B. & Rav. Cort. ochroleucum var. *spumeum*, C. ochroleucum var. *erimosum*, *Grev. I.*, 166. On oak. S. Carolina. Specimens sterile.

**Corticium subrepandum**, B. & Cooke *Grev. VI.*, 81. *Massee Mon.* p. 119. New Jersey.

**Corticium subterraneum**, Rabh. *F. Eur.* 1006. *Massee Mon.* p. 145. Saxony.

**Corticium xanthellum**, B. & C. Venezuela. = barren mycelium only.

**Corticium cretaceum**, Fries *Obs. I.*, 153. Europe, America, etc.

**Coniophora sistotremoides** (Schw.). *Thelephora sistotremoides*, Schwein. *Syn. Car.* 1053. Spores elliptic, olive brown,  $12 \times 8 \mu$ .

**Coniophora atrovirens** (Fries). *Corticium atrovirens*, Sacc. *Syll.* 7540

**Coniophora indica** (B.), *Mass. Mon.* p. 134. Bombay.

## NEW GENUS, SARCOMYCES.

Mr. G. Massee has characterized a new genus of *Bulgaricæ* in the following terms :—

### **SARCOMYCES**, Massee.

Receptacle subgelatinous, subsessile, erumpent, attached by a narrow base; hymenium convex, even, margin acute; asci cylindrical, sporidia uniseriate, coloured, muriformly septate; paraphyses numerous.

Allied to *Hæmatomyxa*, Sacc., but distinguished by the even

marginate hymenium and the uniseriate sporidia. It is doubtful whether the last-named genus really belongs to the *Bulgariææ*.

**Sarcomyces vinosa**, *Mass.* Tremella vinosa, *Berk & Curt.*

Erumper; substipitate, expanding into a more or less circular fleshy disc, plane or convex below, margin acute, patent when moist, incurved when dry; hymenium convex, even, every part perfectly glabrous and dark purple brown; asci cylindrical, attenuated and usually curved at the base; sporidia uniseriate, four in an ascus, elliptical, ends subacute, usually rather oblique, at first triseptate, then with septa formed parallel to the long axis of the spore, slightly, or not at all constricted at the septa, clear brown,  $21-24 \times 8-10 \mu$ ; paraphyses linear, colourless, not incrassated at the tips, aseptate, equal in length to the asci, very numerous,  $2-5 \mu$  thick.

On wood. Venezuela, S. Carolina.

From two-thirds to one inch across, solitary, or two to three in clusters, subgelatinous when moist, cartilaginous and much contracted when dry. With very much the habit and general appearance of *Bulgaria inquinans*, but of a dark purple colour.

The above diagnoses are taken from the "Journal of Mycology," Vol. vi., p. 178, and the specimens are in the Royal Herbarium, Kew.

## FUNGUS FORAYS, 1891.

Consequent on the unsettled state of the weather the fixtures for the Fungus Forays for this year are still rather indefinite.

**CRYPTOGAMIC SOCIETY OF SCOTLAND.**—The seventeenth annual conference will be held at Paisley, on Tuesday, the 22nd September.

**WOOLHOPE FIELD CLUB.**—It is proposed to hold the annual meetings for Fungus Forays during the first week in October, but the details are not yet determined.

**ESSEX FIELD CLUB.**—The present suggestion for the annual Fungus Foray is to the effect that it shall take place in September, and the locality Hatfield Forest. Further particulars will be determined soon.

**HAMPSHIRE FIELD CLUB.**—A desire has been expressed to hold a Fungus Excursion on one of the Fridays in September in the Stratton Woods and Park. To meet at the Micheldean Station.

Thus it will be seen that none of the dates are absolutely determined, except the first, and therefore all who are interested will have to secure more definite information as the time approaches. Up to the present the prospects are not more favourable than they have been during the past two years. A week or two of fine warm weather may make an improvement.

## NOTES ON TREMELLINI.

The following species are not to be traced in *Saccardo Sylloge*.

**Dacryomyces conigenus**, *Niessl. in Wint. Fungi Eur. No. 2628.*

On cones of *Pinus sylvestris*.

**Dacryomyces Poæ**, *Libert. Pl. Crypt. 135.*

On leaves of *Poa sudetica*.

**Dacryomyces pallens**, *Fries. Fckl. Fun. Rhen. 2092.*

On branches.

**Dacryomyces phaseoli**, *Dur.*

On leaves.

**Dacryomyces violaceus**, *Schwein. Syn. Car. 1143.*

On bark.

**Peziza myceticola**, *Berk. & Curt. U. S. Fungi.*

On rotten fungi.

**Peziza porinatum**, *Cooke.*

On decaying *Polyporus*.

These are both of the nature of *Dacryomyces*.

**Auricularia corium**, *Berk. in Herb. Merulius corium, Ayres MSS.*

Pileo effuso-reflexo, sublobato vel crenulato, villosio, fasciatozonato, cervino; hymenio atro-purpureo, plicis distinctissime reticulato-venoso, sporis subglobosis,  $7\ \mu$ .

On dead trunks. Mauritius.

**Auricularia epitricha**, *Berk. in Herb. Auricularia Carteri, Berk.*

Suborbicularis, gregaria, margine recurvo, subtus pallido, velutino, hymenio umbrino, subolivascence, lævi, pruinoso. Sporis  $5 \times 4\ \mu$ .

On bark. Bombay. Neilgherries.

What clue is there in *Saccardo Sylloge* as to the disposal of *Tremella disciformis*, *Fries Syst. Myc. II., 216*?

**Tremella lilacina**, *Mull.*, seems to be the same as *T. sarcoides* from Sealer's Cove, Victoria.

It seems impossible to trace, without index to synonymy, *Ditangium insigne*, *Karst. Fun. Fenn. No. 656.*

## EXOTIC FUNGI.

By M. C. COOKE.

**Cordyceps Speeringii**, *Massee.*

Stroma minute ( $\frac{1}{2}$ -1 c.m. high), ochraceous white, stem cylindrical, a little attenuated below; capitulum subglobose, punctate with the immersed perithecia. Asci cylindrically clavate, octosporous; sporidia linear, flexuous, five septate, not breaking up into joints,  $60 \times 1\frac{1}{2}\ \mu$ .

On Ant (*Formica*). Grenada, W. Indies.

**Sphærostilbe Macowani** (*Korb.*).

The species described by Koerber in the *Österreichische Botanische Zeitschrift*, 1877, p. 357, under the name of *Coniocybe Owani*, according to specimens issued by Arnold, No. 817, are distinctly a *Sphærostilbe*, the perithecia being scattered in fissures of the bark, but with the sporidia immature. The *Stilbum* reaches 2 m.m. in height and the conidia are  $5 \times 3 \mu$ .

On bark. Cape of Good Hope.

**Uredo (Uromyces ?) aloes**, *Cooke.*

Spots suborbicular or confluent, pallid; sori convex, large, circling or clustered on the spots, often confluent, for a long time covered. Spores elliptical or subglobose, smooth, with a thick epispore ( $25-30 \times 20 \mu$ ), pedicels hyaline.

On leaves of *Aloë*. Mooi River, Natal. (*J. M. Wood*, 4511).

## BRITISH TREMELLINEÆ.

REVISED BY M. C. COOKE.

**TREMELLINEÆ**, *Fries.*

Whole fungus homogeneous, gelatinous, collapsing when dry, reviving when moistened, internally composed of branched filaments, terminating in basidia at the periphery. Basidia tapering, undivided or furcate at the apex, or globulose, cruciately divided; spores somewhat kidney-shaped or globose, continuous, germinating and producing sporidioles.

*Sub-Fam. 1. AURICULARIÆ.* Basidia elongated or fusoid, plurilocular.

**AURICULARIA**, *Bull.*

Coriaceous fungi, resembling *Stereum*, effused and reflexed, hymenium gelatinous, reticulately ribbed.

***Auricularia mesenterica*** (*Dicks.*), *Fries Hym. Eur.* 646. *Cke. Hdbk.* No. 919.

Pilei resupinate, then reflexed, entire, villous, zoned and fasciate, brownish cinereous, hymenium costato-plicate, brownish violet; spores oblong, kidney-shaped,  $20 \times 7 \mu$ .

On trunks.

***Auricularia lobata***, *Somm. Fries Hym. Eur.* 646. *Cke. Hdbk.* 920.

Pileus effuso-reflexed, lobed, variegated with strigose or tomentose velvety or smooth zones, brownish white, hymenium livid tawny; folds distant, reticulated; spores as in the above.

On bark.



**HIRNEOLA**, *Fries.*

Membranaceous fungi, often cup-shaped or ear-shaped, cartilaginous when dry; hymenium gelatinous, even or plicate.

**Hirneola auricula** *Judæ*, *Linn. Fries Hym. Eur.* 695. *Cke. Hdbk.* 1032.

Thin, concave, flexuous, blackish, venoso-plicate everywhere, tomentose beneath, cinereous olive. Spores reniform,  $20-25 \times 7-9 \mu$ .

On elder trunks.

**Hirneola polytricha**, *Mont.*

Has occurred in this country on imported timber, but is not indigenous.

*Sub-Fam. 2. TREMELLINÆ*, *Bref.* Basidia globose, or ovoid, when mature longitudinally quadripartite in a cruciate manner, rarely continuous.

**EXIDIA**, *Fries.*

Fungi cup-shaped, truncate or effused, often papillose; spores reniform, continuous for some time, when germinating two or more celled, producing curved sporidioles.

**Exidia recisa**, *Fries Hym. Eur.* 693. *Cke. Hdbk.* 1029.

Very soft, truncate, plane, costate, sub-repand, amber-brown, punctate, scabrous beneath; stem very short, excentric, oblique; spores oblong,  $13-20 \times 2-7 \mu$ .

On branches of willow.

**Exidia glandulosa**, *Bull. Fr. Hym. Eur.* 694. *Cke. Hdbk.* 1030.

Effused, flattened, thick, undulate, blackish, spiculose with conical papillæ, cinereous beneath, and somewhat tomentose. Spores oblong, curved,  $12-14 \times 4-5 \mu$ .

On trunks of oak.

**Exidia albida** (*Huds.*). *Tremella albida*, *Fr. Hym. Eur.* 691. *Cke. Hdbk.* No. 1020.

Ascending, tough, expanded, undulate, subgyrose, pruinose, whitish, when dry brownish; spores oblong, obtuse, curved, biguttulate, subhyaline,  $12-14 \times 4-6 \mu$ .

On branches.

**ULOCOLLA**, *Bref.*

Pulvinate, gyrose fungi. Spores continuous at first, then bicellular and reniform, germinating and producing rod-like conidia.

**Ulocolla saccharina**, *Fries Hym. Eur.* 694. *Exidia*, *Cke. Hdbk.* No. 1031.

Tuberculose, gyrosely-undulate, tawny cinnamon; spores reniform,  $10-12 \times 5-6 \mu$ , conidia about the same size.

On larch.

**Ulocolla foliacea** (*Pers.*). *Tremella*, *Fries Hym. Eur.* 690. *Cke. Hdbk. No.* 1015.

Cæspitose, flaccid, even, diaphanous, undulated, flesh coloured cinnamon, plicate at the base, spores reniform,  $10-12 \times 5-6 \mu$ , with similar conidia.

On stumps.

### **TREMELLA**, *Fries.*

Pulvinate or effused, brain-like, gelatinous, usually smooth. Spores conidia and sporidioles globose or ovoid, always continuous.

#### Sect. I. MESENTERIFORMES.

**Tremella fimbriata** (*Pers.*), *Fries Hym. Eur.* 690. *Cke. Hdbk. No.* 1013.

Cæspitose, erect, corrugated, blackish olive; lobes flaccid, margin incised, undulate-fimbriate.

On branches.

**Tremella frondoso**, *Fr. Hym. Eur.* 690. *Cke. Hdbk. No.* 1014.

Cæspitose, very large, even, pallid yellow; plicate at the base, lobes gyrosely-undulate, casidia globose ( $15 \mu$ ), spores globose,  $10-12 \mu$  diam.

On trunks, oak, etc.

**Tremella lutescens** (*Pers.*), *Fr. Hym. Eur.* 690. *Cke. Hdbk. No.* 1016.

Cæspitose, tremulous, undulately gyrose, white, then yellowish, lobes crowded, entire spores globose,  $12-15 \mu$  diam., sporidioles globose,  $1\frac{1}{2}-2 \mu$  diam.

On stumps.

#### Sect. II. CEREBRINÆ.

**Tremella mesenterica**, *Retz. Fr. Hym. Eur.* 691. *Cke. Hdbk. No.* 1017.

Expanded, ascending, somewhat tough, plicate-undulate, smooth, orange; spores shortly ellipsoid,  $6-8 \mu$  diam.

On branches.

**Tremella intumescens**, *Engl. Bot. t.* 1870. *Fr. Hym. Eur.* 691. *Cke. Hdbk. No.* 1021.

Subcæspitose, rounded or conglomerate, soft, brown, blackish brown when dry, obsoletely punctate, somewhat tortuous and lobed, spores  $12-14 \times 3-4 \mu$ .

On trunks.

**Tremella vesicaria**, *Bull. t.* 427, *f.* 3. *Fr. Hym. Eur.* 691. *Cke. Hdbk. No.* 1018.

Firm, bladdery, much waved and wrinkled, erect, pallid, very viscid within; spores  $10 \times 6 \mu$ .

On the ground.

## Sect. III. CRUSTACEÆ.

**Tremella viscosa**, *Berk. Out.* 288. *Fr. Hym. Eur.* 691. *Cke. Hdbk. No.* 1027.

Effused, resupinate, hyaline, at first white, undulated; spores globose or ellipsoid,  $7-9 \times 6-7 \mu$ .

On rotten wood.

**Tremella epigæa**, *Berk. & Br. Notices No.* 373. *Cke. Hdbk. No.* 1028. *Fr. Hym. Eur.* 692.

Effused, gelatinous, gyroso-plicate, white; spores subglobose,  $6 \times 4 \mu$ .

On naked ground.

## Sect. IV. TUBERCULIFORMES.

**Tremella indecorata**, *Somm. Fr. Hym. Eur.* 692. *Cke. Hdbk. No.* 1022.

Sessile, rounded, moist, convex, plicate, opaque, when dry black-brown, dingy; spores globulose,  $7-9 \mu$  diam.

On willow and poplar.

**Tremella moriformis**, *Berk. Out.* 217. *Fr. Hym. Eur.* 692. *Cke. Hdbk. No.* 1019.

Conglobated, sinuated, mulberry black, opaque, firm; spores ovoid, yellowish,  $16 \mu$  long.

On rotten wood.

**Tremella tubercularia**, *Berk. Outl.* 288. *Fr. Hym. Eur.* 692. *Cke. Hdbk. No.* 1024.

Erumpent; stem short, cylindrical, head plicate, dirty white, nearly black when dry; conidia  $2 \times \frac{1}{2} \mu$ .

On oak branches.

**Tremella versicolor**, *Berk. Outl.* 288. *Fr. Hym. Eur.* 693. *Cke. Hdbk. No.* 1026.

Minute, orbicular, orange, at length brown; spores subglobose  $6 \times 4 \mu$ .

On *Corticium nudum*.

**Tremella atrovirens**, *Fr. Syst. Myc.* II., 232.

Erumpent, disciform, very minutely papillate and rugose, when moist sooty green, black when dry, gregarious or confluent (1 m.m. diam.); threads filiform, swollen at the apex into globose, cruciately septate, olive basidia; spores ellipsoid, subapiculate,  $12-15 \times 10-13 \mu$ .

On dead branches of *Sarothamnus*.

## APPENDIX.

**Tremella sarcoides** (*Dicks.*), *Cke. Hdbk. sub. No.* 1023.

Cæspitose, soft, viscid, pallid, flesh colour, at first club-shaped, then compressed, lobed and plicate, basidia repeatedly dichotomously branched, conidia ovate,  $4-6 \times 3 \mu$ .

On trunks.

= Conidia of *Coryne sarcoides*.

**Tremella clavata**, *Pers. Ic. Pict. t. 10, f. 1. Fr. Epic. 589. Cke. Hdbk. 1023.*

Solitary, simple, incrassated, fleshy red, becoming black at the base.

On branches.

**NÆMATELIA**, *Fries.*

Solid, convex, with a firm, fleshy nucleus; basidia globulose, cruciate; spores ovoid, continuous.

**Næmatelia encephala** (*Willd.*), *Fr. Hym. Eur. 696. Cke. Hdbk. No. 1033.*

Subsessile, pulvinate, plicately rugose, pale flesh colour; sporophores filiform, short,  $2\ \mu$  thick, swollen at the apex in globose basidia, at first guttulate, then 2-4 septate, pale flesh colour; spores globose, pear-shaped,  $15-18\ \mu$  diam.

On pine branches.

**Næmatelia nucleata** (*Schw.*), *Fr. Hym. Eur. 696. Cke. Hdbk. 1034.*

Sessile, flattened, somewhat gyrose, whitish, then tawny yellow; spores ovoid,  $7\ \mu$  long.

On rotten road.

**Næmatelia virescens**, *Corda. Ic. III., f. 90. Fr. Hym. Eur. 696. Cke. Hdbk. 1035.*

Sessile, suborbicular, depressed, gyrose-tuberculate, greenish; basidia spherical; spores ovoid, apiculate,  $18 \times 11\ \mu$ .

On wood.

**GYROCEPHALUS**, *Pers.*

Erect, spathulate; basidia normal; spores ovate-pyriform, continuous.

**Gyrocephalus rufus** (*Jacq.*). *Guepinia helvelloides, Fr. Hym. Eur. 697.*

Erect, substipitate, variable, subspathulate, rosy orange, becoming reddish, hymenium inferior, smooth; spores ovoid, apiculate at the base,  $12-15 \times 8-10\ \mu$ .

On the ground.

*Sub-Fam. 3. DACRYOMYCETÆ, Bref.*

Basidia tapering, clavate, furcate above, the tips at each end sterigmate.

**DACRYOMYCES**, *Nees.*

Pulvinate gyrose; spores when mature or in germination transversely or murally divided; conidia catenulate.

**Dacryomyces macrosporus**, *Berk. & Br. No. 1374. Fr. Hym. Eur. 698.*

Gelatinous, tuberculate, rosy, spores oblong, then 3-5 septate, constricted at the joints.

On branches.

**Dacryomyces deliquescens** (*Bull.*), *Fr. Hym. Eur.* 698. *Cke. Hdbk.* 1038.

Roundish, rooting, convex, immarginate, yellowish, at length twisted, hyaline; spores oblong, curved, triseptate,  $15-16 \times 6-7 \mu$ .  
On pine wood.

**Dacryomyces stillatus**, *Nees. Syst. p.* 89. *Fr. Hym. Eur.* 699. *Cke. Hdbk.* 1039.

Somewhat round, convex, at length plicate, yellow or orange, colour persistent, spores multiseptate,  $18-22 \times 8 \mu$ .  
On rotten wood, etc.

**Dacryomyces chrysocomus** (*Bull.*), *Fr. Hym. Eur.* 669. *Cke. Hdbk.* 1040.

Orbicular, golden yellow, spherical when young, immarginate, soon collapsed, peziza-like, at length flattened, persistently smooth; spores multiseptate, ellipsoid, diluted yellowish,  $20-28 \times 9-11 \mu$ .

On rotten pine wood.

**Dacryomyces succineus**, *Fr. Hym. Eur.* 699.

Gregarious, punctiform, somewhat gelatinous, smooth, amber, externally growing pale when moist, disc darker and immarginate spores cylindrical, straight, obtuse, 2 guttulate, hyaline,  $14 \times 2 \mu$ .

On pine leaves.

**Dacryomyces sebaceus**, *Berk. & Br. No.* 1305. *Fr. Hym. Eur.* 699. *Cke. Hdbk.* 1037.

Somewhat rounded, cup-shaped, whitish, internally composed of branched filaments, somewhat clavate above (sporophores); spores multiseptate,  $12\frac{1}{2} \times 7\frac{1}{2} \mu$ .

On branches.

**Dacryomyces torta** (*Berk.*). *Tremella, Fr. Hym. Eur.* 692. *Cke. Hdbk. No.* 1025.

Minute, round, depressed, gyrose-tuberculate, yellow or orange; spores cylindrical, curved, triseptate,  $12 \times 4-5 \mu$ .

On decorticated oak.

**Dacryomyces (?) vermiformis**, *Berk. & Br. No.* 1700.

Minute, grey, worm-shaped, sporophores globose,  $12\frac{1}{2} \mu$ ; spores globose, pallid rufous,  $5 \mu$  diam.

On rotten wood.

### **GUEPINIA**, *Fries.*

Unequally cup-shaped, often stipitate, disc sporebearing; conidia developed externally on the excipulum.

**Guepinia peziza**, *Tul. Ann. Sci. Nat.* 1853.

Cup-shaped, sessile, smooth, yellow, adnate behind, stem slender; spores oblong ellipsoid, at first simple, then 1-3 septate,  $10-13 \times 4-6 \mu$ , on rather clavate sporophores.

On dead branches.



**DITIOLA**, *Fries.*

Between coriaceous and corky, hymenium discoid, gelatinous ; spores continuous at length uniseptate.

**Ditiolela radicata** (*A. & S.*), *Fr. Sys. Myc.* II. 170. *Cke. Hdbk.* 1044.

Stipitate or rooting ; cups nearly plane, disc golden yellow, stem thick, white ; spores subellipsoid, for the most part curved or unequal, uniseptate,  $8-12 \times 4-5 \mu$ .

On wood.

**APYRENIUM**, *Fries.*

Subglobose, sessile, internally hollow, externally subgelatinous ; spores continuous.

**Apynrenium lignatile**, *Fr. Hym. Eur.* 700. *Grev. Crypt. t.* 276. *Cke. Hdbk.* 1041.

Rounded, deformed, externally and internally pallid ; spores rounded.

On pine wood.

**Apynrenium armeniacum**, *Berk. & Br. No.* 1141, *t.* 2, *f.* 2. *Cke. Hdbk.* No. 1042.

Lobed, subgelatinous, peach colour ; spores obovate,  $13 \times 8 \mu$ , hyaline, basidia filiform, branched.

On wood.

## MEMORABILIA.

**Strobilomyces polypyrarnis**, *Hook. in Berk. Decades No.* 332.

On the ground. Jillapahar, India.

This species has been omitted from Saccardo's Sylloge.

**Spegazzinia tessarthra** (*B. & C.*), *Sacc. Syll.* IV., No. 3582.

From the figures it would appear that the species described by Patouillard under the name of *Triposporium cristatum*, *Bull. Soc. Mycol. France*, 1888, p. 125, is none other than this species, which was called *Sporidesmium tessarthrum*, *B. & C.*, and *Tetrachia tessarthra*, *Berk.*

MISSING LINKS.—We should be glad to find the following in Saccardo's Sylloge, but at present have not been successful :—

**Colletotrichum microsperrum**, *Corda Icon.*

**Zasmidium cellare**, *Fries.*

**Alytosporium fulvum**, *Fries.*

**Alytosporium croceum**, *Schw.*

**Alytosporium pteridicola**, *Schw.*

ON DACRYOPSIS, *Massee*.

The above new genus has been characterized by Mr. Massee in the "Journal of Mycology" for 1891, p. 180, for a group of Tremelloid Fungi.

**DACRYOPSIS**, *Massee*.

Small gelatinous fungi, fertile portion capitate, sharply defined, terminal on a more or less elongated stem, composed of parallel simple or branched septate hyphæ; at the apex of the stem the hyphæ are very much interlaced, forming a compact expanded layer, from which originate in first instance numerous slender gonidiophores, spreading on every side to form a more or less capitate head; gonidia minute, one celled, forming a dense layer; basidia cylindrical, bifurcate, aseptate, springing from the interlaced layer of hyphæ at the apex of the stem, either contemporaneous with, or later than the gonidiophores. Spores simple or septate.=*Coryne*, Berk., in part.

During the gonidial stage the structure is identical with that of *Tubercularia*, the stem is often more elongated than in the last named genus, but in *Dacryopsis nuda* even this unimportant difference disappears. The basidiæ and spores closely resemble those met with in *Dacryomyces*, to which genus the present is closely allied, differing in the structure of the stem, and in the arrangement and form of the gonidiophores.

The gonideal phase of *Dacryopsis nuda* is morphologically almost indistinguishable from the form-species known as *Tubercularia vulgaris*, but it is well known that the latter is the gonideal condition of the ascigerous fungus called *Nectria cennabarina*, hence it is seen that two structures almost indistinguishable in the gonideal form may be conditions of Ascomycetous and Basidiomycetous fungi respectively. Again it is known that the gonideal condition of various species of *Nectria* belong to such morphologically distinct form genera as *Tubercularia*, *Fusidium*, *Volutella*, etc.; consequently it appears to be at least indiscreet to assume, much more to assert, that because a gonideal form presenting certain morphological features has been clearly proved to be a condition of some higher fungus, belonging to a given genus, that another gonideal form of similar structure must necessarily be a condition of some hypothetical species of the same genus. Such assumptions do not harmonize with the stated belief of those mycologists who consider that a complete life history is necessary to prove relationship, or otherwise, in suspected cases, a belief that has brought conviction to the mind of most disciples of the Friesian school, whose conceptions of affinity are based on characters derived from mature examples, which in many instances are of no genetic value. On the other hand, it is to be regretted that the modern school, having adopted the only

reliable test of affinity—life history—should endeavour to indicate affinity from analogy to such an extent as is too frequently done. The close morphological agreement between the gonideal condition in the present genus and in *Coryne* further illustrates the same idea.

**Dacryopsis gyrocephala**, *Mass.* *Coryne gyrocephala*, *B. & C.*, *Grev.* II., 20.

Gregarious or scattered; head hemispherical, plane below, with ridges arranged in a gyrose manner, dark purple, blackish purple when dry; stem equal or slightly incrassate above, smooth, even, pale, tan coloured, 2-3½ millim. long, 1½ mill. thick; gonidiophores covering every part of the head, simple, aseptate, straight, 40-50  $\times$  1½  $\mu$ ; gonidia terminal, continuous, colourless, elliptic-oblong, 2½  $\times$  1  $\mu$ ; basidia projecting beyond the gonidiophores, aseptate cylindrical, bifurcate near the apex, 60-65  $\times$  6-7  $\mu$ ; spores continuous, colourless, elliptic-oblong, slightly curved, with an oblique apiculus at the base, 15-16  $\times$  4-4½  $\mu$ ; clavate, paraphyses numerous, shorter than the gonidiophores.

On rotten wood. Lower Carolina.

**Dacryopsis Ellisiana**, *Mass.* *Coryne Ellisii*, *Berk.* *Grev.* II., 33.

Gregarious, head broadly elliptical or elliptic-oblong, smooth, even, pale brown, 4-6  $\times$  2-4 mill., stem cylindrical, longitudinally wrinkled, 3-4  $\times$  1½-2 mill., dark brown; gonidiophores covering the entire head, straight, septate, with 1-3 short branchlets near the apex, 40-50  $\times$  2½  $\mu$ ; gonidia continuous, colourless, elliptic-oblong, very slightly curved, 3  $\times$  1  $\mu$ ; basidia cylindrical, bifurcate at the apex, aseptate, 50-55  $\times$  6  $\mu$ ; spores elliptic-oblong, with an oblique apiculus at the base, 14  $\times$  5  $\mu$ .

On decaying basswood log. New York.

**Dacryopsis unicolor**, *Massee.* *Coryne unicolor*, *Berk. & Curt.*

Gregarious, entire fungus blackish brown; head globose, small, smooth, even, 1½-2 mill. diam.; stem elongated, erect, slightly attenuated upwards, vaguely longitudinally rugulose, 5-8  $\times$  1-1½ mill.; gonidiophores covering every portion of the head, linear, curved, septate, with a few short lateral branchlets, 70-80  $\times$  1½  $\mu$ ; gonidia elliptic, oblong, continuous, colourless, 3  $\times$  1  $\mu$ ; basidia appearing after the gonidiophores, aseptate, bifurcate at the apex, 45-50  $\times$  5-6  $\mu$ . Spores continuous, colourless, elliptic-oblong, with an oblique apiculus at the base, 15  $\times$  4-4½  $\mu$ .

On rotten wood. Cuba.

**Dacryopsis nuda**, *Massee.* *Ditola nuda*, *Berk. Ann. Nat. Hist.*, *Ser.* II., *Vol.* II., 267.

Gregarious; head hemispherical, flattened below, at first even, then minutely rugulose, reddish orange, 3-4 mill. diam. Stem short, stout, equal, white, or tinged with yellow, minutely tomentose, 3-4  $\times$  2-2½ mill., even; gonidiophores appearing before the basidia, linear, straight, aseptate, simple, or rarely with one or two short branchlets near the apex, 35-40  $\times$  1½  $\mu$ ; gonidia

elliptic-oblong, continuous, colourless,  $3 \times 1 \mu$ ; basidia projecting considerably above the gonidiophores, cylindrical, bifurcate at the apex,  $55-60 \times 5-6 \mu$ . Spores elliptic-oblong, colourless, with an oblique apiculus at the base, triseptate,  $14 \times 5 \mu$ .

On fir stumps. Britain.

**Coryne rugipes**, Cooke *Grev.* VIII., 58. *Ombrophila*, Sacc. *Syll.* VII., 2536.

Is allied, and *not* ascigerous.

## NEW BRITISH FUNGI.

By M. C. COOKE.

**Agaricus (Flammula) Aldridgei**, *Massee*.

Pileus convex, then infundibuliform ( $1\frac{1}{2}$ -2 in.), with a somewhat involute margin, dry, velvety, testaceous with a tinge of orange. Stem slender, equal, flexuous, hollow (4 in. by  $\frac{1}{4}$  or  $\frac{1}{3}$  in.), smooth, of the same colour, with a white floccose mycelium at the base. Gills deeply decurrent, rather crowded, lanceolate, golden yellow, becoming ferruginous yellow. Spores slightly apiculate at the base,  $16 \times 5 \mu$ .

On the ground. Petersfield.

A remarkably distinct and characteristic species, near *A. gymnopodius*.

**Paxillus subinvolutus**, *Batsch fig.* 204. *Inocybe subinvoluta*, Sacc. *Syll.* 613.

On a careful consideration of the original description and figure, and comparison with living specimens, we have come to the conclusion that the species of Batsch was really a *Paxillus*, with a rather lateral stem, and gills parting from the pileus. Spores amber,  $7 \times 5 \mu$ .

On the ground. Sussex.

The following is the description given by Batsch to accompany his figure:—

Pileus subfoveatus, et subobliquus, margine exteriore deflexus, eximio inferne demum arcte involutus, superficie glaber, et margine convexo, citius attenuato, excepto, fere totus constans e stipitis crassi terminali dilatatione, stipitis crassitem non multum excedente. Stipes validus strictus, rudis, superficie subæqualis, nitoris expers, rugis obliquis coalescentibus in infera parte obductus, paullulum elatis, sed primum crebro contactu clarioribus; superne versus lamellas tomentosus. Color magis in carneum vergit. Basis obtusa terræ innascitur. Lamellæ elongatæ longiores, sensim stipiti effusæ; secundi ordinis oblongæ, pone obliquæ truncatæ, una cum prioribus integræ, pileo parallelæ; tertii ordinis marginales minutæ, oblongæ, inferne convexæ. Omnes nec ultra modum angustatæ, nec coalescentes; substantia pallida, vix in colorem ochraceo-livescentem vergens, medullosa, solum in cortice fibrosa, obscurior, uda.

## HOST-INDEX OF U.S. FUNGI.\*

We have before us the third and final part of this work, which will doubtless prove of considerable value to the mycologists of America. It may be taken for granted that any work associated with the name of Professor W. G. Farlow will be carefully and conscientiously executed. In Europe such indices are not numerous, and certainly not up to date. Westendorp constructed a small general Index in 1854 to 1865, and subsequently C. Roumeguere (in 1870) issued a similar work, but neither of these are sufficiently complete now to be of much service. It is matter of opinion whether it serves any useful purpose to include, for instance, *Cladosporium herbarum* over and over again, upon different hosts, when it is common to so many, and special to none. The difficulty is in drawing the line of exclusion, and yet no one would regard *Corticium læve* or *Poria vaporaria* as confined, or even having a predilection for any single host.

In the present list an advance is made on its predecessors in including the recent synonyms, and especially those adopted by Saccardo in his "Sylloge." How this has been done may be gathered from the following reprint of the supplementary names given in the Appendix for

## PYRUS MALUS, L.

- Agaricus adiposus, Fr.
- { Agaricus pulvinatus, P.
- { Pleurotus pulvinatus, Sacc.
- Ceratostomella mali, Ell. & Ev.
- Cercospora mali, Ell. & Ev.
- Clitopilus conissans, Pk.
- Didymella mali, Ell. & Ev.
- Entomosporium maculatum, Lev.
- { Gloeosporium fructigenum, B.
- { Gloeosporium versicolor, B. & C.
- Hendersonia foliorum, Fckl.
- Hendersonia mali, Thum.
- Hypoxyton Morsei, B. & C.
- { Monilia fructigena, P.
- { Oidium fructigenum, Kze. & S.
- Nectria mammoidea, P. & Plow.
- Ozonium auricomum, Lk.
- { Peziza inquinans, Cke.
- { Patinella inquinans, Sacc.
- { Peziza regalis, C. & E.
- { Pezizella regalis, Sacc.
- Phoma piricola, Ell. & Ev.
- Phyllosticta pirina, Sacc.
- { Podosphæra Kunzei, Lev.
- { Podosphæra oxyacanthæ, (D.C.)

\* "A Provisional Host-Index of the Fungi of the United States," by W. G. Farlow and A. B. Seymour, 1891.



- { *Sphaeria collapsa*, S.
- { *Sphærella collapsa*, Cke.
- Sphærella sentina* (Fr.), Sacc.
- { *Sphaeria subbullans*, S.
- { *Sphærella subbullans*, Cke.
- Sphæroopsis malorum*, B.
- Sphæroopsis malorum*, B., var. *foliicola*, E. & E.
- Sporotrichum cinereum*, Pk.
- Polyporus igniarius* (L.), Fr.

By the way, we hardly see the grounds for the omission, under the last name, of the synonym

*Fomes igniarius* (L.), Fr.

We observe another divergence from previous host-indices, in that the particular part of the plant is not named upon which the parasite is seated. It has been customary to group them together, as found upon, either the wood, bark, leaves, flowers, fruit, etc. This is not a very important omission, but it is a new departure. Considering the vast amount of labour involved in the production of such an Index, it would be most unfair to complain that it is not absolutely perfect. For the United States it is the only one, and for a general Index it is an important advance and aid, should any industrious Teuton determine to follow suit.

Finally, this work exhibits the vast strides which the science of mycology has made in the States during the past quarter of a century, through the perseverance of a few earnest men. To them it is a record and a testimonial. The next work we are anticipating is a monograph of the *Pyrenomycetes*. It will be some years before we may hope for a complete synopsis of the Fungi of the United States.

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## APPLE SCAB.

### *Fusicladium dendriticum*.

We have this year received strongly developed specimens of this fungus on the leaves of the apple, from different parts of the country, and from Australia a profusion of examples. The fungus and its ravages are generally so well known that we may dispense with a description, but we will offer some observations on the remedies which have been proposed in the United States, where the pest is plentiful, as detailed in the report of the Commissioner of Agriculture. There remains no doubt, as we suggested in 1873, that the fungus on the leaves and the fruit is practically the same.

The fungus appears to be retarded by the heat of summer. Its most rapid growth takes place during moist cool weather, such as we have had prevailing for a long time. On the treatment of this pest the report in question states: "The fungus of the apple scab does not penetrate into the tissues of the host, and very early in its development it is wholly exposed to any application which may be made to destroy it. It appears, however, that the vegetative

portion, or plant body, of this as well as of many other fungi, is very resistant to the action of chemical reagents quite as much or more so than are the tissues of the leaf or apple upon which it grows. We can scarcely hope, therefore, to accomplish its destruction, unless it be the growths infesting the young shoots and the scales of buds. Before the latter expand in the spring much stronger solutions can be applied than it is possible to use later in the season, and it is at this period that the warfare against this fungus should begin. It has been observed that the germination of the spores is wholly prevented in very dilute solutions of copper, and our chief dependence in combating this disease appears to rest upon this fact, the possibility of preventing the germination of the spores where they can do harm. A practical treatment has been discovered by which we may prevent the germination of the spores of the downy mildew of the grape vine, by applying various solutions of sulphate of copper to the surface of the leaves upon which the spores of the fungus fall. It is doubtless equally practical to accomplish by a similar treatment a like result in the case of the *Fusicladium* of the apple. Experiments already made with the sulphate of copper solutions indicate that they will, when properly applied, at once check the 'scab.' Further and more systematically conducted experiments are required in order to determine fully what preparation is most efficacious, at what season it is best to make the application, and the strength to which the solutions must be limited. Where *eau celeste*, prepared according to the original formula, has been tried it has severely burned and injured the foliage. This preparation may be rendered less caustic by the addition of ordinary carbonate of soda."

"Another and more simple modification of the *eau celeste* is prepared by dissolving in one quart of liquid ammonia, four to six ounces of carbonate of copper, then dilute with water to 25 gallons. The ammonia and carbonate of copper solution may be kept in a bottle and diluted when required for use at the rate of about one ounce of the solution to the gallon of water. Those who have used this preparation on the grape vine say it is perfectly harmless to the foliage, and is as efficient against mildew as *eau celeste*.

"Simple solutions of sulphate of copper should not be employed during the growing season, as their use is almost certain to result in injury to the foliage. The Bordeaux mixture may be used at any time without fear of injury. In using one or the other of these preparations the following course of treatment is suggested:—

"(1) In early spring, before the buds have commenced to expand, spray the trees thoroughly with a solution of sulphate of iron, using four pounds of the iron sulphate to four gallons of water.

"(2) As soon as the fruit has set, apply the Bordeaux mixture, or one of the modified preparations of *eau celeste*.

"(3) If the weather should be such as to favour the development of the 'scab' fungus, a third application should be made two or three weeks after the second, using the same materials.

"In addition to the effect that these applications may have on the development of the fungus, they will doubtless serve to keep off many insect pests.

"In storing the fruit for the winter, especial care should be taken to separate all the apples showing any signs of the scab from those which are smooth and healthy, and they should all be kept in rooms or cellars free from moisture."

These are the sum total of the recommendations which have been made, but we have no positive information as to the practical results.

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## CEYLON IN AUSTRALIA.

BY THE EDITOR.

Curious facts in geographical distribution are constantly presenting themselves to those who have any extensive experience in the plants, especially the fungi of distant regions. It is of common knowledge that such species as *Schizophyllum commune*, *Fomes lucidus*, *Polystictus occidentalis*, *Polystictus sanguineus*, *Stereum lobatum*, and some others, are to be met with in all countries, from warm temperate to the equator, but there are many species which are not by any means so common, or widely distributed, which occur only in countries far apart, and with broad expanses of ocean between them. There is no better illustration of this than the occurrence of Ceylon species of fungi in Australia. This is not confined to one or two species, but is manifest in several species, of which we will proceed to instance a few. There are *Agaricus (Lepiota) dolichaulos*, B. & Br., *Agaricus (Lepiota) leontoderes*, B. & Br., *Agaricus (Lepiota) aspratus*, B., *Agaricus (Lepiota) lepidophorus*, B. & Br., *Agaricus (Lepiota) rhyparophorus*, B. & Br., all Ceylon species of *Lepiota*, which occur also in some parts of Australia. In scarcely any other subgenus of *Agaricus* are so many Ceylon species found outside the limits of the island. What are the special conditions which conduce to the appearance of the above species of *Lepiota*, indigenous to Ceylon, in Australia?

Undoubtedly the climate of Australia is favourable to the growth of *Boletus* and *Strobilomyces*, but, up to the present, the only Ceylon species found in Australia is the gigantic *Boletus portentosus*, B. & Br. But Ceylon is not productive for *Boleti*, and, as far as we remember, this is the only indigenous species, and that solitary one has appeared in Queensland, quite fourteen inches in diameter of the pileus.

Amongst the *Polyporei* there is no more marked instance than the occurrence of *Polystictus Peradeniæ*, B. & Br., which, as its name indicates, was first found in Ceylon, but has since been collected in most of the Australian colonies. Whatever errors of determination there might be with fleshy putrescent fungi, there is no room for doubt in this species, which is remarkable for its distinctive character.

*Irpex flavus*, Kl., and *Irpex zonatus*, B., are not original Cinghalese species, but they are also Australasian, as well as somewhat common in Ceylon.

*Kneiffia Muelleri*, B., first found in Australia, was afterwards detected in Ceylon, and we have no record of it elsewhere.

*Hymenochæte strigosa*, B. & Br., was first described from Ceylon, and afterwards recognized in Australia. *Hymenochæte rhabarbarina*, B. & Br., also a Ceylon species, has been found in New Zealand.

*Corticium simulans*, B. & Br., in addition to Ceylon and the United States, has been collected in Australia.

*Stereum pusillum*, B., has only been recorded from Ceylon and Tasmania. Also *Stereum sparsum*, B., only for Ceylon and Australia.

*Coniophora murina*, Massee, was described from Ceylon, and since detected in Australia.

*Aseröe zeylanica*, B., is recorded for Ceylon and New Zealand.

*Lycoperdon lilacinum*, M. & B., although occurring in other localities, is also common to Ceylon and Australia.

*Epichlœ cinerea*, B. & Br., first received from Ceylon, has recently been collected in Australia.

*Xylaria Schweinitzii*, B. & C., at first from Surinam, and afterwards from Ceylon, has been more than once detected in Australia.

Far from attempting an exhaustive list of these coincidences we have only alluded to a few of the most striking which occurred to us, to serve as an illustration of our contention that there is a strange relationship between the fungi of Ceylon and Australia. Probably in the preparation of our projected "Handbook of the Fungi of Australia" we may be able to present a more complete account of these coincidences. Whatever the explanation may be, it must be remembered that the majority of the above are large, conspicuous species, and not minute parasitic fungi, which may be transported here, there, and everywhere.

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# Grevillea.

A QUARTERLY RECORD OF CRYPTOGAMIC BOTANY  
AND ITS LITERATURE.

## NOTES ON THELEPHOREI.

By M. C. COOKE.

### **Beccariella Trailii**, *Cooke*.

Spathulate, or broadly obovate, entire or lobed, stipitate, thick, spongy, becoming thick towards the fimbriate margin, white, densely tomentose at the base, margin almost smooth, stem lateral, stout, cylindrical, tomentose; hymenium radiato-rugulose, ridges thin, acute, margin irregularly broken up into short, conical, tooth-like processes; spores globose, apiculate, 7-8  $\mu$  diam.

On logs. Rio Junia, Brazil. (Dr. Traill.)

From 2-4 in. across, stem  $\frac{1}{2}$ - $\frac{2}{3}$  in. long,  $\frac{1}{2}$  in. thick.

### **Beccariella Kingiana**, *Massee*.

Reniform, thin, brittle when dry, and bullato-rugulose, surface woolly, ochraceous-buff, margin thin, rather fimbriate; sessile, attached by a lateral disc at the sinus; hymenium radiato-rugulose, folds not prominent, thin edged, at the margin broken up into crowded, slender, small, hair-like spines, rufous-tan when dry; spores globose, apiculate, 5  $\mu$  diam.

On rotten log in a damp place. Goping, Malay Archipelago. (Dr. G. King.)

From 3-4 in. wide,  $1\frac{1}{2}$  in. broad.

### **Hypolyssus Sprucei**, *Massee*.

Clavate, stipitate, erect, white, becoming pale fawn-colour when dry; hymenium completely surrounding the club-shaped hymenophore, smooth and waxy, very regularly longitudinally grooved, cracked when dry; sterile apex plane, minutely velvety; stem distinct, slender, minutely tomentose downwards; basidia tetrasporous, spores globose, 4  $\mu$  diam., colourless.

On wood and branches. Amazon Valley. (Spruce.)

Entire fungus about  $\frac{2}{3}$  in. high.

We fail to trace the following species in Saccardo's Sylloge:—

### **Thelephora fusca**, *Fries (?) in Libert's Supp. No. 406.*

Spores globose, spinulose, 10  $\mu$  diam., not *Corticium fuscum*, *Pers.*

- Thelephora marginata**, *Veull. Rev. Myc.* 1882, p. 175. *Fungi Gallici* No. 2209.
- Thelephora griseozonata**, *Cooke Grev.* XIX., p. 104.  
On branches. S. Carolina.
- Thelephora stereoides**, *Cke. & Mass. Grev.* XVIII., p. 5.  
Victoria, Australia.
- Thelephora tesseraria**, *Berk. & Warm.* No. 8531.  
Rio Janeiro.
- Thelephora zygoesmoides**, *Ellis N.A. Fungi* 715.  
Spores globose, spinulose, 8-10  $\mu$ .  
New Jersey.
- Thelephora regularis**, *Schwein Syn. Car.* 999.  
Salem, Carolina, U.S., Zanzibar.
- Thelephora Hostmanniana**, *Mont. in Herb. Berk.*  
Carolina, U.S.  
We have not been able to find the description of this species.
- Thelephora ribesia**, *Fr. Syst. Myc.* I., 444. *Schwein. Amer. Bor.* 719.
- Stereum modestum**, *Berk. in Herb.*, is evidently *Peniophora papyrina* (*Mont.*).
- Stereum prolificans**, *Berk. & Br. Linn. Trans.* XVI., 41.  
Cape York, Brisbane, Melbourne.
- Stereum pictum**, *Berk. Mass. Mon.* 185.  
Brazil.
- Stereum fissum**, *Berk. Hook. Journ., Dec.*, No. 603. *Mass. Mon.* 169.  
Brazil.
- Stereum fodinarum**, *Mont. Ann. Sci. Nat., Ser.* III.  
Spain.  
We do not find the description, as indicated on the specimen from Montague in *Herb. Berk.*
- Stereum Haydeni**, *Berk. in Herb. Mass. Mon.* 199.  
Ohio.
- Stereum inconcinnum**, *Berk. in Herb.*, is *Auricularia*.  
New Orleans (Drummond).
- Stereum Kurzeanum**, *Cooke in Grev.* XVIII., 55.  
Java (Kurz).
- Stereum phalenarum**, *Kalch.*, is *Stereum prolificans*, *B. & Br.*
- Stereum rigens**, *Karst. Ryssl. Hattsvam; Thum. Myc. Univ.* 2111. *Roum. Fungi Gallici* 4809.
- Stereum Schraderi**, *Thumen*, is *Stereum striatum*, *Fries.*
- Stereum venustulum** (*Sp.*), *Thelephora venustula*, *Speg. F. Guar.* I., 36. *Sacc. Syll.* 7092.

**Stereum aquilum**, *Fries in Herb. Berk.*

Mexico.

Specimen from Fries himself, but with no indication where described.

**Stereum rubro-pallens** (*Schw.*), *Thelephora rubro-pallens*, *Schwein. Amer. Bor.* 677.

Spores elliptical,  $6-7 \times 3 \mu$ .

**Stereum arenicolum**, *Berk. Mass. Mon.* 201.

On sand. Vera Cruz.

**Stereum æquinotiale**, *Mont. in Herb. Berk.*

Guiana.

Specimen from Montagne, without reference to diagnosis.

**Stereum spongiosum**, *Mass. Mon.* 172. *Thelephora Micheneri*, *B.*, in part.**Stereum sulfureum**, *Fries Fungi, Mex.* *Stereum citrinum*, *Berk. & Rav. in Rav. Fungi Car.* III., 28.

Cuba, Ceylon, Mexico, Georgia, S. Carolina, Nicaragua, S. Australia.

## AUSTRALIAN FUNGI.

By M. C. COOKE.

(Continued from p. 7.)

**Corticium sulphurellum**, *Cke. & Mass.*

Broadly effused, usually forming a very thin pulverulent bright sulphur-yellow stratum, when perfectly evolved the hymenium is waxy and polished. Spores obliquely pip-shaped,  $7 \times 4 \mu$ .

On bark of dead branches. Oakleigh, Victoria. (*Martin*, 925.)

**Secotium scabrosum**, *Cke. & Mass.*

Peridium hemispherical, depressed, dingy olive or greyish, minutely scabrid. Gleba lacunose, septa gill-like, waved and folded, dark reddish-brown. Spores lemon-shaped, rather coarsely warted, pale olive-yellow,  $16-18 \times 10 \mu$ . Stem very short, almost obsolete.

On the ground. Domain, Melbourne. (*Baron Mueller*.)

**Diploderma melasperma**, *Cke. & Mass.*

Subglobose, about one inch in diameter. Exoperidium thin, persistent, densely velvety, grey. Endoperidium thin, smooth, cinnamon. Nucleus small; mass of spores blackish-umber; capillitium dense. Spores globose, very minutely warted,  $4 \mu$ .

On ground. Port Phillip. (*Baron Mueller*.)

**Bovista hypogea**, *Cke. & Mass.*

Subterranean. Globoso-depressed (about one inch), outer cortex persistent, thin, white, silky; inner layer thin, whitish;

flexible, dehiscing by a very minute determinate pore at the apex; mass of spores bright yellow-olive. Capillitium very dense. Spores globose, warted,  $6-7\ \mu$  diameter.

Subterranean or partly exposed. Adhering so firmly to the soil as to be with difficulty removed.

On the ground. Gipps Land. (*Martin*, 934.)

**Polysaccum album**, *Cke. & Mass.*

Peridium globose, 5-6 c.m. diameter, white, polished and shining, attenuated below into a very short, stout, irregular, stem-like base. Peridiola irregularly polyhedral, 2-3 m.m. across. Spores in the mass yellowish-olive, globose, rather coarsely warted, 9-10  $\mu$  diameter.

On the ground. Dundoo, Queensland. (*Martin*, 916.) Victoria.

**Zignoella (Zignaria) erumpens**, *Cooke.*

Scattered, or aggregate, erumpent, and then nearly superficial, or semi-immersed. Perithecia globose, smooth, black ( $\frac{1}{3}$  m.m. diam.), slightly papillate. Asci cylindrically clavate, octosporous. Sporidia fusoid-elliptic, uniseptate, slightly constricted, binucleate ( $15-16 \times 4-5\ \mu$ ), hyaline.

On twigs. Victoria. (*Martin*, 948.)

**Coniothyrium septorioides**, *Cke. & Mass.*

Epiphyllous. Spots orbicular, tawny, with a broad purple margin. Perithecia mostly in circles upon the spots, sometimes scattered, black, erumpent, globose, membranaceous. Sporules broadly elliptical, continuous, pale brown,  $5-6 \times 3-4\ \mu$ .

On leaves of *Frostanthera lasiantha*. Grampians, Victoria. (*Baron Mueller*.)

**Diplodia canthifolia**, *Cke. & Mass.*

Epiphyllous. Perithecia scattered, immersed, membranaceous, dark brown, piercing the cuticle. Sporules elliptical, for a long time continuous, then elongated and uniseptate, slightly constricted, brown ( $8 \times 5$  then  $12 \times 5\ \mu$ ).

On leaves of *Canthium latifolium*. Tempe Downs. (*Mueller*.)

**Coryneum viminalis**, *Cke. & Mass.*

Pustules punctiform, flattened, scattered, black; not seated on definite spots. Conidia obovate or pyriform, 1-2 septate, not constricted ( $8-10 \times 5-6\ \mu$ ), pale purple-brown, on rather long filiform sporophores,

On leaves of *Eucalyptus viminalis*. Victoria. (*Reader*.)

**Stilbum caninum**, *Cke. & Mass.*

Gregarious, clavate or subspathulate, flesh-coloured (2-3 in. high), capitulum darker, continuous with the smooth stem. Conidia ellipsoid, continuous, hyaline,  $5 \times 3\ \mu$ .

On dog's dung. Victoria. (*Martin*, 944.)

Stem sometimes furcate. Larger, and more robust than *S. fimetarium*, with smaller conidia.



## NEW BRITISH FUNGI.

BY M. C. COOKE.

(Continued from p. 25.)

**Agaricus (Amanita) aridus**, *Fr. Hym. Eur.* 25. *Fr. Icon. t.* 12, *f.* 2. *Sacc. Syll.* 40.

Pileus flattened, thin, obtuse, grey, naked (6-7 c.m. broad), margin sulcate, flesh white; stem stuffed, then hollow at the apex, attenuated upwards, nearly equal, almost smooth (8-10 c.m. long), ring distant; gills attenuated, adnate.

On the ground. Dunstable. (*W. G. Smith.*)

**Agaricus (Lepiota) nymphaeum**, *Kalch. Hung. t.* 2, *f.* 1. *Fr. Hym. Eur.* 33. *Sacc. Syll.* 122.

Pileus fleshy, convex, then expanded, umbonate, torn into concentric scales, wholly white, or with a brownish disc (5-8 c.m. broad); stem hollow, equal, smooth (swollen at the base), floccosely mealy above the distant ring (8 c.m. long, 1 c.m. thick); gills attenuated behind, free, white.

On the ground. Warwickshire. (*Mrs. Russell*, fide *W. G. Smith.*)

**Agaricus (Leptonia) anatinus**, *Lasch. No.* 561. *Fr. Hym. Eur.* 201. *Sacc. Syll.* 2921.

Pileus rather fleshy, campanulate, with a darker umbo, longitudinally fibrillose and squamulose, greyish brown (1-2 in. diam.). Stem somewhat hollow, becoming blue (especially at the apex), at first pruinose, then scaly-fibrillose, even at the apex (not punctate with black); gills adnexed, seceding, broad, whitish, then flesh-colour. Spores oblong,  $10 \times 7 \mu$ .

Under oaks. Near Alresford, Hants.

**Cortinarius (Inoloma) argutus**, *Fries Hym. Eur.* 359. *Sacc. Syll.* 3785.

Pileus compact, conical, then flattened, rather gibbous, silky-fibrillose, ochraceous (8-10 c.m. broad); stem solid, ventricose, fibrously scaly, white, then yellowish, base distinctly rooting (8 c.m. long, 2 c.m. thick); gills adnate, rather distant, white, then clay-coloured. Spores  $14-16 \times 9 \mu$ .

On the ground. Alresford, Hants.

**Porothelium Friesii**, *Mont.*

The only British specimen in *Herb. Berk.* is evidently *not* that species, but *Corticium porosum*, B. & C., from Wothorpe. Hence the species cannot be retained as British unless another locality for it can be authenticated.

**Clavaria rufescens**, *Schæff. Icon. t.* 288. *Fr. Hym. Eur.* 670.

Trunk thick, elastic, tan-coloured, very much branched, branches multifid, crowded, somewhat fastigate, even, tan-colour, with red tips.

On the ground. New Forest.

**Clavaria fuliginea**, Pers. *Myc. Eur.* i., 166.

Gregarious, cinereous, becoming rufescent (2-3 in. high, 2 in. broad), very much branched; stem thin, larger branches thick, compressed; lateral rather incomplete; branchlets somewhat fastigiate, short, acute. Spores globose ( $10\ \mu$ ), with an apiculus, ochraceous.

On the ground. Burnham Beeches.

**Helotium deparculum**, Karst. *Myc. Fenn.* 150. *Buck. Brist. Fung.* XIII.

Gregarious, at first sphæroid, then nearly plane, when dry hemispherical and concave, sessile, mealy-puberulous, pallid, or pallid yellow, when dry ochraceous or reddish yellow ( $\cdot 03\text{--}\cdot 04$  m.m. broad). Asci cylindrically clavate, 4-spored ( $30\text{--}45 \times 4\text{--}5\ \mu$ ); spores linear-fusoid, straight or slightly curved, simple or pseudo-septate ( $12\text{--}15 \times 1\frac{1}{2}\ \mu$ ), paraphyses few, slender.

On dead stems of *Spiræa ulmaria*. Ashton.

**Lachnella fragariastris**, Phillips in litt. *Buck. Brist. Fun.* XIII.

Gregarious; stipitate, firm, cyathiform, faint purplish red, paler near the margin, clothed with short, hyaline, simple hairs, usually enlarged at the summit; asci subclavate; sporidia fusiform or oblong-fusiform ( $5 \times 1\text{--}2\ \mu$ ); paraphyses acerose, rather stout, somewhat abruptly acuminate.

On dead strawberry stems. Clevedon.

**Oligonema furcatum**, Buck. *Fungi Bristol p.* XIII.

Sporangia scattered, globose, shining, bright chrome yellow, as well as capillitium and spores; elaters cylindrical, simple, or branched, slightly thickened at the obtuse ends, with a faint open spiral ( $3\text{--}4\ \mu$  diam.); spores globose, minutely warted ( $11 \times 12\ \mu$  diam.).

On rotten trunk. Near Bristol.

**Perichæna confusa**, Massee in litt. *Buck. Bristol Fungi* XIII. *Ophiostoma umbrina*, Ellis N. A. F. 726. *Perichæna variabilis*, Rostk. *Physarum vermiculare*, Schwein.

Sporangia hemispherical and scattered, or æthalioid, and often forming an irregular network, pale umber or dingy ochraceous, dehiscing irregularly; capillitium well developed, forming an irregular loose network, threads (2-4 thick) irregularly notched; spores subglobose ( $13\text{--}14\ \mu$  diam.), smooth; mass of capillitium and spores dingy ochraceous, sometimes with a suggestion of olive.

On wood. Yatton.

**Sporotrichum læticolor**, Cke. & Mass.

Effused, when mature forming a loose, pulverulent, bright golden-yellow stratum; hyphæ procumbent, variously branched, septate,  $3\text{--}4\ \mu$  diameter; spores elliptic-fusiform, smooth, base truncate, very copious, produced singly on short lateral branchlets,  $8 \times 4\ \mu$ .

On bark. Halifax. (Crossland.)

## SACCARDO SYLLOGE FUNGORUM.

The ninth volume of this work has been issued, and contains the first portion of an Universal Supplement, from Agaricaceæ to Laboulbeniaceæ; and the tenth volume containing the remaining portion is promised in 1892. This latter part is also to include a Bibliography, a repertorium of species according to their hosts, an alphabetical Index of species, and an alphabetical Index to the families, genera, and sub-genera in the entire work.

The present volume of 1,140 pages gives the diagnoses of about 4,500 additional species of Hymenomycetes, of Gasteromycetes, of Hypodermeæ, of Phycomycetes, and of Pyrenomycetes, including the new species published during the progress of the work, and supplying many of the omissions in the previous volumes. The task has been a herculean one, and perfection was hardly possible, where such an immense mass of scattered literature had to be consulted; but this supplement will do much towards rendering the work complete. Of course the volumes will be indispensable to every public library, as well as every private library of scientific pretensions, and although costly, will supply the place of an immense bulk of periodical publications, and, in the end, prove a saving of money, as well as of space, to the specialist, both of which advantages are not to be despised.

## MEMORABILIA.

GEASTER HYGROMETRICUS.—Mr. Percy Grimshaw has found three or four old specimens of this *Geaster* in Yorkshire.

CORDYCEPS SHERRINGII, *Massee*.—By error this species was called *Speeringii* in "Grevillea," p. 15, whereas it should have been as above.

HYPOCRELLA TUBERIFORMIS (B. & R.), *Cooke*.—The species called *Hypocrea tuberiformis*, B. & Rav., see *Sacc. Syll.* II., 4902, was assumed by Patouillard to be identical with his *Dussiella tuberiformis* (B. and R.), Pat., see *Sacc. Syll.* IX., 4021, but this is called in question by G. F. Atkinson, in "Botanical Gazette," October, 1891, where he states that they are *not* identical, and that *Hypocrea tuberiformis*, B. & Rav., should be called *Hypocrella tuberiformis*, as stated by ourselves, years ago, in "Grevillea," Vol. xii., p. 105, No. 161.

INDEX TO COOKE'S ILLUSTRATIONS.—A few copies are left of a special Index to the plates in this work, in alphabetical order, giving the MS. numbers to the plates, according to the systematic arrangement adopted in the several Indices to the volumes, thus enabling any plate to be found at once, when bound in systematic order. The price is one shilling each, direct.

AGARICUS (PANÆOLUS) FIMIPUTRIS.—We have just discovered that in "Illustrations of British Fungi" the names on two of the plates have been transposed by misadventure.

Plate 625 should be *Ag. phalenarum* with the appendiculate veil, and

Plate 626 should be *Ag. fimiputris* with the annular zone on the stem.

Subscribers and purchasers will please note the correction.

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## FUNGUS FORAYS IN 1891.

On all hands we have received intimation that the fleshy fungi have been more plentiful this year than for three or four seasons past; indeed, they could not well have been worse than in 1889 and 1890. Doubt and uncertainty prevailed so late into the year that the enthusiasm for Fungus Forays cooled down, and the most celebrated and ancient of all Fungus Forays, that of the week with the Woolhope Club at Hereford, was represented by a single day. The customary *two* days of the Essex Field Club diminished to *one*, which latter had to be abandoned, on account of the death of the proprietor of the property on which the hunt was to have taken place. The Hampshire Society only arranged for a half-day trip, but that proved to be a successful and enjoyable one, as the weather was fine. The Hackney Society held no Fungus meeting, but the Hertfordshire Society held their usual Saturday, which proved a success as far as regards the fungi. The Cryptogamic Society of Scotland was undaunted, and kept the "even tenor of its way," but, on the whole, it will be seen that Forays were not in the ascendant.

We have heard of no extraordinary appearances and no remarkable new species, except those recorded in another page of this Journal as new to Britain. Mr. Masee has reported that *Tremellodon gelatinosum* was so plentiful in the New Forest that it might have been collected by the hundredweight, and yet we had always considered this rather a rare species with us. A singular incident occurred in September, when a large cluster of *Agaricus* (*Psalliota*) *Elvensis* came up under a pear tree in our own garden, so that for a week or more our table was continuously supplied. It is one of the best of edible species, and some of the specimens had a pileus of six inches in diameter. How, and why, did it select our garden? We had only known of it at Neasden, miles away, in previous years, whence we had many a delicious morsel. The only probability we can think of is that old specimens, showing trace of maggots, had been cast away two or three years ago, and that, in course of time, the spores germinated. It is a habit with us to fling all fungus *débris* into the garden, so as to give them a chance if so disposed. If the present species is liable to propagate itself in that manner it will be a valuable species for domestic purposes. We shall be curious to see if it continues to flourish in the same spot another year.



## HANDBOOK OF AUSTRALIAN FUNGI.

We are able to announce that at length arrangements have been made with the several governments of Australia for the publication of a Handbook of Australian Fungi, by M. C. Cooke, in one octavo volume, with coloured and plain plates, illustrating all the principal genera and subgenera, with the descriptions of the genera and species in English. It is anticipated that this work will be printed in a few months, having been already commenced. The material consists of the species published by Kalchbrenner in this Journal, the majority of which passed through the author's hands at the time; the species described by Berkeley and Broome, which again had been communicated, by one or other of the last named, at the time of publication, and a vast number of specimens, amounting to some thousands, which were from time to time communicated by Baron F. von Mueller, F. M. Bailey, Mrs. Flora Martin, F. Readey, Dr. Berggren, and others in Australia. Besides the copies which will be despatched to the Colonies, a few will remain for sale in Europe at about forty shillings each. The plates will, as far as possible, represent Australian species, most of the fleshy kinds being transcripts of water-colour sketches made on the spot, and these will be executed in chromo-photography by the same hands as the plates of Cooke's Illustrations of British Fungi. It is confidently expected that the entire work will be ready for publication about Midsummer, 1892, and will be issued under the sanction and authority of the Governments of New South Wales, Victoria, Queensland, South Australia, and Tasmania.

## BRITISH EDIBLE FUNGI.\*

For manifest reasons we cannot express any opinion on the book before us, although we may call attention to its contents. As no complete and satisfactory volume on British Edible Fungi has appeared since that by Dr. Badham, of which the first edition is dated 1847 and the second 1863, there need be no apology for filling up a vacancy. Attempts have been made in the interim, but, without being invidious, we may describe them as disappointing. For some years our mycological friends have pressed us to issue such a book as the present, but the pressure did not avail until we had seen the last plate of our "Illustrations," and then we yielded, but with what success it is not our province to judge. The twelve coloured plates include figures of about 45 species, and the letter press of 240 pages is printed in clear and legible type, so that, even as books go, it is a cheap volume for three half-crowns. In all there are thirty-five chapters, and what is neces-

\* "British Edible Fungi, how to distinguish, and how to cook them," with coloured figures of upwards of forty species, by M. C. Cooke. One Vol., 8vo, cloth. Kegan, Paul, Trench, Trubner, and Co.



sary to say about them may be gathered from the preface, which is to the following effect :—

“ Fungus eating is on the increase, thanks to Field Clubs and Fungus Forays, but the complaint has been heard for many years that no sufficient handbook for the guidance of young or inexperienced mycophagists could be found in the English language. One or two laudable attempts have been made, but they have left much to be desired, and for the past ten years my fungus-eating friends have continued to urge me, as one of the oldest fungus eaters, to give the results of my experience. Admirable as Dr. Badham’s book was when published, and fully as it answered its purpose then, no one will contend that it is ‘up to date.’ However, the world is large enough for both of us. The list given at the end will represent all the kinds that I remember to have eaten, and as sixty-five will be considered sufficient to establish my claim to be a fungus eater, it may also be regarded as sufficient to exonerate me from any charge of presumption or inexperience. It has usually been the custom to include poisonous and edible fungi in one book, but from this custom I have diverged, for two or three reasons. It is not commendable to popularize knowledge of vegetable poisons easy to procure. It is not advisable to mix the descriptions and figures of good and bad species without distinct labelling, as on a chemist’s bottle, of ‘poison’ across each noxious species. And it is *not* desirable to increase the bulk and cost of a little book which was intended in furtherance of ‘fungus eating.’ Copious notes have been added on the preparation of the different species for the table, some old and some new, but all practical. By the aid of the descriptions in writing, as untechnical as possible, and the coloured figures, it is hoped that all reasonable care has been taken to prevent error or danger in eating mushrooms or toadstools. If I have rendered the art of fungus eating easier or safer I shall have accomplished my object.

“ M. C. COOKE.”

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## AGARICUS GIGANTEUS AND A. MAXIMUS.

BY M. C. COOKE.

We have heard recently that in some quarter or other an exception has been taken to the accuracy of our figures, under these names, in the “Illustrations of British Fungi.” Doubtless it is always easy to doubt or deny, but not so easy to prove. According to our own judgment we were accurate in our determination, although not inclined to be positive that our judgment is superior to that of any one else with an approximate experience. In this determination the Rev. M. J. Berkeley expressed his acquiescence at the time. Hence the figures represent fairly what we both conceived to be the two species. Against this decision an adverse opinion has

now been expressed in the following words: "Dr. Cooke has wrongly named them in his Illustrations (see Plate 135, where *A. giganteus* is figured under the name of *A. maximus*, and Plate 106, where *A. Paxillus* is figured under the name of *A. giganteus*."\* Let us first dispose of the last sentence, anent a confusion of *A. Paxillus* with *A. giganteus*. Referring to 'Fries Hymenomyces Europæi,' p. 224, we discover that the only Agaric therein called *Agaricus Paxillus* is a species of *Pholiota*, of a wholly cinnamon colour, with cinnamon spores, belonging therefore to the series *Dermini*, whereas the figure of *A. giganteus* is not cinnamon, has no ring, as *A. Paxillus* should have, but on the contrary is yellowish white, and leucosporous, or with nearly colourless spores. Perhaps, however, in assuming to correct one error another has been made, and that instead of writing *A. Paxillus* as a contraction of *Agaricus Paxillus* it should have been, 'a species of *Paxillus* is figured under the name of *A. giganteus*,' and, if so, it may be assumed that the writer intended *Paxillus giganteus* (Sow.) according to Fries Hym. Eur., p. 401. Thus stated it would have amounted to this, 'on Plate 106 *Paxillus giganteus* is figured as *Agaricus giganteus*.' And here we are ready to admit that the *Paxillus giganteus* of Fries Hym. Eur., p. 401, is possibly the same as the *Agaricus giganteus* of Fries' 'Epicrisis,' p. 67, although not cited by Fries as a synonym. Sowerby's figure 244 is quoted, however, under both names." Our sole error, then, appears to be that we have followed Fries in his "Epicrisis" in retaining *Agaricus giganteus* under the genus *Agaricus*, instead of accepting his more recent transposition to the genus *Paxillus* (Fries Hym. Eur., p. 401). We do not care to go all over the question as to whether the *Agaricus giganteus* of Sowerby is a true Agaric, or a species of *Paxillus*, or how *Agaricus giganteus* and *Agaricus maximus* are confused in the "Handbook," but will take the two species as they stand—*Agaricus giganteus*, Fries Epicrisis, p. 67, and *Agaricus maximus*, Fries Hym. Eur., p. 401—leaving out of the question, for the present, Sowerby's fig. 244.

**Agaricus (Clitocybe) giganteus**, Fries Epic. p. 67. Mon. I., 118.  
*Paxillus giganteus*, Fr. Hym. Eur. 401. Letell. t. 682. Sver.  
 Svam. 86. Sow. t. 244 (?).

Broad, rather cæspitose, wholly tan-white. Pileus at first depressed, then broadly or flatly infundibuliform, thin, but equally fleshy, soft, not flaccid, but easily splitting from the margin towards the centre, as much as a foot broad, often excentric, and for the most part sinuately lobed, when fresh moist and adglutinately villose, when dry delicately flocculose, and cracked into scales. Margin at first involute, pubescent; soon spreading, smooth, and at length revolute, sulcately channelled, or radiately rugose. Stem solid,

\* In an advance proof of a review sent to the publishers of "Edible Fungi."

compact, and hard without and within,  $2\frac{1}{2}$  in. long, 1-2 in. thick, equal, even, smooth. Gills a little decurrent, numerous, crowded, 3 lines broad (two or three times as broad as the flesh of the pileus), connected by veins, thin, fragile, whitish, then yellowish or rufescent, soon mealy with the white spores.

In grassy places.

This is distinguished by its robust form, resembling *Lactarius vellereus*, short, thick stem, shallow saucer-shaped pileus, sometimes margin sulcate; gills a little decurrent, 3 lines or more broad, thin and splitting, mealy; often very gregarious.

Berkeley's description of this species is not literally the same as that given by Fries; it was published under 987 in *Annals of Nat. Hist.*, 1865, and employed in preference for the British form, in Cooke's "Handbook" (2nd edition), No. 161, as follows:—

"Pileus infundibuliform, not umbonate, slightly flocculose, white, opaque; stem equal, thick; gills white, then yellowish, shortly decurrent."

He also states that "the pileus is slightly viscid when moist, 9 in. across, with a stem  $2\frac{1}{2}$  in. high, 1 in. thick;" but he does not think it represented by Sowerby's figure. Afterwards he held it to be represented by "Illustrations," Pl. 106, which may be accepted as the *Ag. giganteus* of Berkeley, but whether of Fries or of Sowerby may be left an open question. The description in Berkeley's "Outlines," p. 110, is dated 1860, and therefore prior to his description given independently in 1865.

**Agaricus (Clitocybe) maximus.** *Fr. Epic. p.* 67. *Mon. i.*, 119. *Hym. Eur.* 93. *Buxb. c. iv.*, t. 1.

Pileus fleshy, disc compact, otherwise thin, rather flaccid (not splitting), broadly infundibuliform, umbo-central gibbous (to a foot broad); always very dry, surface silky, smooth, or squamulose, tan, growing pale or whitish. Margin involute, pubescent, always even; flesh white, at length soft. Stem solid, compact, but spongy within, elastic, 4 in. long, 1 in. thick, attenuated upwards, fibrillose, striate, whitish. Gills deeply decurrent, attenuated to each end, rather crowded, soft, simple, whitish, not changing. Odour faint, pleasant.

In shady woods, amongst leaves.

A large species with a deeply funnel-shaped pileus, flesh thin and flaccid, except at the disc; gills narrow, gradually attenuated to each end, deeply decurrent behind. Stem long, from 4 to 8 in.; spongy within, striate with fibrils externally.

Berkeley (*Annals Nat. Hist.*, No. 987) refers Sowerby's Plate 244 to this species, whilst Fries (*Hym. Eur.*, 401) refers it to his *Paxillus giganteus*. Hence it can hardly be considered typical of either.

The description given under the name of *Agaricus giganteus*, Sow., in *English Flora*, p. 33, is supposed to be represented by

Sowerby's figure, and to include the *Ag. infundibuliformis*, var. *maximus*, of Fries Elenchus, p. 13. It only needs a reference to the literature of the subject to discover that the two names *giganteus* and *maximus* are intricately mixed up, at least, prior to 1865, and we must take leave to doubt whether the long explanatory note given by Stevenson (Vol. II., p. 66) under *Paxillus giganteus*, can be wholly applicable to that species, and not indiscriminately to both, for the quotation is from Berkeley, and was written in 1836, or nearly thirty years before he had recognized a distinction between *Ag. maximus* and *Ag. giganteus*.

Buxbaum's figure (Cent iv., Pl. 1), the only one quoted by Fries under *Ag. maximus*, although rough, represents the habit of *Ag. maximus* as we have interpreted it in "Illustrations," Plate 135, on a considerably reduced scale.

### MASSEE ON MUCORS.\*

As a natural consequence of the rapid increase in the number of genera and species of the British Fungi it has become necessary to prepare and issue "Handbooks" for various smaller groups, instead of, as of old, attempting works which would include the whole range of British Fungi. What such an universal handbook would have to be *now* it is almost fearful to contemplate, certainly the cost would be beyond the means of the ordinary student, and, as no publishers would undertake it, the author would have to be the victim of his own zeal. Besides this, students themselves shrink from any attempt to grasp the whole subject, contenting themselves with small and well defined groups, within their power of investigation. To such persons large and cumbersome books would be a nuisance, including, as they must do, a very large proportion in which they have no abiding interest. No apology, therefore, is needed for the production of such volumes as Phillips' "Discomycetes of Britain," Plowright's "British Uredineæ," Grove's "British Schizomycetes," Cooke's "Myxomycetes of Great Britain," and now of Massee's "Phycomycetes and Ustilagineæ."

The latter work is introduced by a short preface which declares that "the object of the present book is to bring up to date the British species of Fungi included in the divisions known as the *Phycomycetes* and the *Ustilagineæ*. Many species, and even genera, belonging to the first named division are new to our flora, and careful search will undoubtedly reveal more new forms. The great interest in connection with such fungi, however, is not so much the discovery of new species as a careful investigation into the life-history of forms already known. When this is done, and not before, it will be possible to speak of genera and species from a

\* "British Fungi, Phycomycetes and Ustilagineæ," by George Massee. Eight plates. L. Reeve and Co.



fairly safe standpoint. The introductory part of the present volume will give the reader an idea of the amount of investigation yet necessary as proved by the directly opposed views of the best workers on subjects that are of primary importance."

The volume contains chapters on Morphology, Geographical Distribution, Lichen-forming Fungi, Myxogasters, Schizomycetes, Collection and Preservation of Fungi, Examination of Fungi, Classification, and Fossil Fungi. It is not evident from this synopsis that the book treats, really, of three groups of fungi, somewhat related, or analogous to each other, but belonging, as the table shows, to the *Zygomycetes*, the *Oomycetes*, and the *Mycomycetes*. That is to say, there are the true Mucors, or the old *Phycomycetes*, and with them the *Peronosporæ*, and allies, formerly included with the *Mucedines*; and finally the *Ustilagineæ*, more commonly associated with the *Uredineæ*. The reason for this association is rather obscure, especially as regards the last group.

The general introduction will be read with much interest, and it occupies nearly half the volume, the residue, containing descriptions, being the practical, or working, portion for the determination of species. Such information as that contained in the introduction will be especially welcome to students, as it is written in a popular style, and will commend itself also to those who are only in search of general information, without any intention of sitting down to a practical study of the subject. Accustomed to teaching, with a fund of experience, the author is here to be seen at his best, but we cannot say that we admire the execution of the plates. The figures are hard and wooden, in many cases, and often heavy and ugly. They will not compete with those we are in the habit of seeing in foreign works, such as those of Brefeld for example, and do not say much for English pictorial art as applied to scientific subjects.

It is hardly necessary to state that we are not fully in accord with the writer in all his conclusions and opinions. Here and there we meet with such opinions, but as they are mostly on matters of secondary importance, and even sometimes qualified in their expression, we see no occasion to parade them. Taking the book as a whole, we are prepared to extend to it our unqualified recommendation, and to coincide in the hope expressed in the last paragraph of the preface "that other volumes dealing with the remainder of the fungi will not long be delayed." As Mr. Massee is a persevering and industrious worker, it will hardly be *his* fault if such a consummation be not attained.

In order to convey some idea of the style and matter of the introduction we will transcribe a few paragraphs by way of specimen: "From a broad point of view the characters that separate plants from animals are (1) permanent cell-walls composed of cellulose, at least when young; (2) the presence of chlorophyll, which enables plants to feed on inorganic food. It is well known that certain plants belonging to widely separated natural orders have



degenerated so far from the ancestral stock as to have lost the power of forming chlorophyll, and in consequence, like the fungi, have become parasites, or saprophytes; the bird's nest orchis, *Neottia nidus-avis*, and toothwort, *Lathræa squamaria*, are examples, but in most cases these degenerate species still retain the same general structure, so that there is but little difficulty in consigning them to their proper order, although in some instances these phanerogamic departures from the typical stock have become so modified as to present but slight affinities with any of the normal groups, the fungi, in like manner, appear to have descended from chlorophyll-producing ancestors, but such ancestors were very much lower down, or nearer the starting point of plant life, than flowering plants, and are represented at the present day by the simple green algæ, furnished with sexual organs, illustrated by such genera as *Vaucheria*. The *Saprolegniæ*, mostly aquatic fungi, and the *Peronosporæ*, inhabiting the tissues of living plants, may be considered as illustrations of forms near the starting point of the fungi proper, and omitting for the moment the presence of chlorophyll in the one case, and its absence in the other, the above-mentioned algal and fungal forms present many important morphological features in common. In both there is the same long, irregularly-branched vegetative portion, in both the tips or interstitial portions become swollen into a more or less globose receptacle or *oogonium*, the female organ of reproduction, into which the protoplasm becomes aggregated and retained by the formation of septa across the tube. This oosphere is fertilized by a small organ or *antheridium* produced in close proximity to the oogonium, or on a distinct branch, depending on the particular species. It is very important to bear in mind that the above account is not intended to convey the idea that fungi actually originated from the algal genus *Vaucheria* and allied forms, but simply to show that at the points indicated the homologies between algæ and fungi are very pronounced.

“In the degenerate forms of flowering plants, already mentioned, we find several distinct starting points, as in *Orchidaceæ*, *Scrophulariaceæ*, *Balanophoræ*, etc., and although agreeing in the common feature of having the power of developing chlorophyll arrested, yet these starting points of new plant ideas must have been separated by long intervals of time, inasmuch as the aberrant members of the two first-mentioned orders would still be typical members of their respective orders, if furnished with chlorophyll, whereas, in the last order, the species have become so much modified that they are not in close touch with any order of chlorophyll-bearing plants, a fact implying a long period of time since they broke away from their normal ancestors, because it must be remembered that there is no evidence in favour of the idea that plants without chlorophyll originated as such, whereas the evidence in favour of the idea that all plants without chlorophyll have descended from chlorophyll-producing ancestors is very strong.

"Judging from the case of fungi, there is no reason why the side issues of flowering plants, characterized by absence of chlorophyll, should not become so thoroughly differentiated from the parent stock as to constitute a distinct group, phanerogamic fungi.

"In like manner, it is not necessary to assume only one point of departure for the fungi from the algæ, but the close agreement between the *Saprolegnieæ* and certain algæ indicates the origin of the fungi, and shows also that between the two examples given the point of divergence is not wide. It is observable in almost every instance of a marked departure from a typical group, that the earliest departures remain stereotyped at a certain stage of development as a group, characterized by features partly their own and partly those of their arcestors; connecting links, in fact. Certain elastic members of this first group in turn develop new features, and where the new departure is able to hold its ground in the struggle for existence, this process of evolving new morphological and physiological factors, a process generally contemporaneous with the obliteration of the original characteristics of the stock from which the new type originated, is repeated, until eventually a group of organisms is produced possessing strongly marked features in common, and only in touch with the group from which it evolved in the possession of those characters common to all plants.

"In illustration of the above, it may be mentioned that in those sections of fungi, of which the mushroom and puff-ball are characteristic, there is not the remotest indication, morphologically or physiologically, not even in the earliest phase of development, of any affinity with the algæ, and it is only by means of tracing the origin of these terminal groups of fungi from others lower in the scale of fungal differentiation that their true origin and sequence can be determined. From what has been said respecting the evolution of the fungi from the algæ, and also of the sequence from the most highly differentiated to the primitive group of fungi, there is the danger on the part of the reader of assuming that the origin and sequence of development of the fungi is fairly complete. To guard against any misconception it is important to state clearly that such is not the case; it is generally admitted that the fungi are of algal origin, and, further, that the main divisions of fungi are connected with each to such an extent that the idea of independent starting points is not suggested; but it must be remembered that each of the main sections in which fungi are naturally divided is composed of several smaller sections, and the sequence of origin and affinity between these minor sections are yet far from being settled. We may conclude this portion of the subject by stating that the most fascinating branch of biology—embodied in the term (life-history)—can alone indicate the required evidence for a satisfactory solution of the affinities between the various sections."

The volume is neatly printed, and there is an index of terms, an index of plant and animal hosts, and a systematic index at the end.—M.C.C.

## RUSSULA REDIVIVA.

*Russula* is in the opinion of all mycologists one of the most puzzling, for the discrimination of species, in the whole range of the Agariciini. The short descriptions given in Manuals and *Epicrises* are barely sufficient in the most facile of genera and sub-genera, but here something more seems to be necessary, and we have long desired to collect together the various independent descriptions, and all the illustrative notes which could be found, which would aid in the elucidation of a difficult subject. The best way to achieve such an object is by no means clear, nevertheless, some experimental course might be adopted, and the publication of one or two examples would perhaps serve to suggest how something more complete could be done. With this view we have selected the following species as a commencement, and leave them to be their own comment.

***Russula (Rigidæ) lactea.*** *Pers. Syn.* 439. *Fries Epic.* 355. *Hym. Eur.* 443. *Fr. Mon.* p. 190. *Quelet Jura* 182. *B. & Br., Ann. N. H.* 1133. *Stevenson B. F.* II., 118. *Cooke Hdbk.* II., No. 1199. *Cooke Illus. t.* 1070. *Gillet Champ.* 234. *Sacc. Syll.* 1809. *Agaricus lacteus, Krombh. t.* 61, f. 1-2. *Paulet Champ. t.* 74, f. 2.

Mild, milk white; pileus fleshy, compact, unpolished, then *rimulose*; margin straight, thin, obtuse, even; stem solid, compact, obtuse; gills *free, thick, distant*, rigid, rather forked.

On the ground under beech. Rare.

Stem spongy in the centre, although very hard, as much as  $1\frac{1}{2}$  in. thick. Pileus at first white, campanulate, dry, then tan-coloured, white, rimulose, convex then depressed, and often excentric. Gills at length adnate, rather crowded, very broad, furcate at the base and apex. Edible.—*Hym. Eur.* 443.

Persoon's original description was, as usual, extremely short:—"Pileus rather depressed, white; margin even; gills watery, pallid." In beech woods. "Pileus 3 in. broad; gills rather thick, often connected with veins; stem longer than in the former." (*Ag. niveus*).

When recording this for the first time as a British species Berkeley wrote: "The thick distant gills and milk-white pileus characterize this fine species, which is probably widely diffused."

Stem solid, compact, at length spongy-soft within,  $1\frac{1}{2}$ -2 in. long,  $1\frac{1}{2}$  in. thick, equal, even, always white. *Pileus compact*, and everywhere fleshy, campanulate, then convex, often excentric, 2 in. diam., without pellicle, always dry, at first *white*, even, then tan-coloured white, rimulose when dry, spreading, even, obtuse; flesh compact, white; gills free, very broad, thick, distant, rigid, furcate, white. Allied to *R. rubra*. The figures of Krombholz correspond to specimens collected, which were smaller, less compact; pileus convex, then expanded, at length rather depressed; gills simple. This must not be confounded with decoloured forms of other species,

such as *R. nivea* (which is *R. fragilis*), *R. depallens*, etc.—*Fr. Mon.* II., 190.

Krombholz describes it thus:—"Usually solitary; pileus always depressed, white or whitish, compact, fleshy, smooth; margin straight, thin, rather obtuse, even; gills broad, distant, thick, rigid, quite entire, white, simple, rarely forked; stem rather long, compact, solid, rather thick, smooth, white, a little attenuated above and below; flesh firm, taste mild, odour none."—*Krombh.* VIII., 23.

The figures of Barla (t. 15, f. 11-13), quoted by Fries under this species, are referred by Quelet to the supposed species which he names *R. incarnata*, but which we consider as only a variety of the above.

var. **incarnata** (Quel.). *Cooke Hdbk.* II., 1199. *Cooke Illus.* t. 1071. *Russula incarnata*, *Quel. Ass. Fr.* 1882, p. 10. *Sacc. Syll.* 1881. *R. lactea*, *Barla t.* 15, f. 11-13.

Pileus convex, then depressed (6-9 c.m. wide), mealy, then areolate, white, tinged with rose, at length tan-coloured, growing pallid; flesh granular, white, sweet, sapid; stem stuffed, firm, pruinose, snowy-white; gills adnate, broad, bifurcate, rigid, yellowish-white; spores elliptically spherical, 9  $\mu$ , aculeolate, hyaline, then lemon-yellow.—*Quelet*.

Under firs.

Barla's description in the text, is literally the same as that of Krombholz for *R. lactea*, quoted above.

var. **livida**. *Bresadola Hedwigia* 1885, p. 10.

Pileus fleshy, soon depressed in the centre, flattened, then infundibuliform (3½-7 c.m. diam.); margin even, very light smoke colour, whitish when old, sometimes yellowish; gills rounded behind, or obtusely acuminate (2-4 m.m. broad), acuminate adnexed, white, becoming yellowish, at first somewhat crowded, in old age distant; stem stuffed, subcylindrical (2-3½ c.m. long, 7-10 m.m. thick), white; flesh dense, white; taste mild, or scarcely acrid; spores white, rather yellowish, globose, very minutely echinulate (4-5  $\mu$  diam.).—*Bresadola*.

In woods.

**Russula (Rigidæ) virescens** (Schæff.). *Fries Epic.* p. 355. *Fr. Hym. Eur.* 443. *Mon.* II., 191. *Berk. Outl.*, t. 13, f. 6. *Cooke Hdbk.* I., No. 622, II., No. 1200. *Stevenson B. F.* II., 119. *Gillet Champ.* 234. *Cooke Illus.* 1039. *Sacc. Syll.* 1810. *Agaricus virescens*, *Schæff. Icon.* t. 94 (not fig. 1). *Hussey II.*, pl. XI. *Pittadini t.* 31. *Barla t.* 16, f. 10-12. *Venturi t.* 17, f. 1-2. *Sturm. Fl.* III., t. 31. *Eng. Fl.* v., 23. *Badham, p.* 101. *Russula æruginosa*, *Krombh. t.* 67, f. 1-10. *Pers. Obs.* 103.

Mild. Pileus fleshy, firm, globose, then expanded and umbilicate, innately flocculose, or areolate and warted; margin straight, obtuse, even; stem spongy or solid, stout, somewhat rivulose, whitish; gills free, rather crowded, unequal and forked, whitish.

In birch woods, etc.

Pileus often unequal, always dry, cuticle falling away in areolæ.



Differs from the greenish species in the prior section (*Furcatæ*) in not being always green, but also verging on yellow.

Between *R. æruginosa*, Pers. Obs. 103, and *Ag. virescens*, Schæff., I discover no limit, nor between Secretan, 514, 516, 517. —*Fr. Hym. Eur.*

Pileus green, without pellicle, innately flocculose, then rivulose, areolately squamose, easily distinguished from all others. Taste mild, edible. Stem solid, spongy within, firm, white. Pileus compactly fleshy, globose, then expanded, at length depressed, often unequal, always dry, not pelliculose, cuticle flocculose, splitting up into areolæ or warts. Margin straight, obtuse, even. Size and colour variable, now deep, now pallid, and now green, becoming yellowish. Flesh white, less compact. Gills free, rather crowded, less yellowish in front than its allies, sometimes equal, sometimes furcate, mixed with a few shorter ones, white.—*Fr. Mon.* 191.

SPORES scarcely echinulate,  $6\ \mu$  (W. G. S.),  $8-10 \times 8\ \mu$  (Britz.),  $6-7\ \mu$  (Bizz.),  $6-7\ \mu$  or  $8-9 \times 8\ \mu$  (Sacc.).

Pileus 4 in. broad, convex, at length slightly depressed and irregular, of various livid hues, yellow, purple, and green, fleshy, rugulose, very slightly viscid, margin even. The edge of the pileus sometimes hangs down in a singular manner. The texture is altogether vesiculose, consisting of roundish cells. Gills white, forked, sometimes anastomosing at the base, rather close, moderately rigid, elastic. Spores round, white. Stem 1-2 in. high,  $\frac{1}{2}$  an in. or more thick, obtuse at the base, various in form, slightly reticulated with raised lines. Taste and odour mild.—*Eng. Fl.* v., 23.

Pileus from two to four inches across, never viscid, fleshy, firm, at first globose, then umbilicate, expanded, much depressed in the centre in age, but the margin always remaining plane, obtuse; the cuticle is shining, thin, transparent, splitting at the margin, pallid, or variously shaded with ochraceous tints, covered with a thicker stratum, which is opaque, ceraceous, farinose, broken up at length into irregular warts of a dull verdigris or glaucous hue. Gills pure white, perfectly free, but in age appearing slightly decurrent from the depression of the pileus, unequal, rather distant, forked particularly at the junction with the stem, exceedingly crisp, firm, and brittle, varying greatly in breadth in different individuals, for the most part sublanceolate. Stem white, subrivulose, thick, nearly equal, hard, compact, not stuffed, but homogeneous, entirely composed of cells, softening in the centre with age. The flesh both of the stem and pileus is pure white.—*Hussey*.

The following are the forms described by Secretan, and cited by Fries :—

**R. cogrammata.** *Sec. No.* 514.

“Pileus in the centre bright orange, mixed with greyish, mealy, and dull. This tint is distributed at the sides in small labyrinthine compartments; the intervals which separate the granular spots are



white. Surface dry sounding in the hand. It is at first hemispherical, the margin folded in, the summit a little depressed, then plane, the centre always sunk, and more or less deformed; margin slightly depressed. Diam.  $4\frac{1}{2}$  in. Flesh white, firm, brittle, 4 lines thick. Gills white, having about the margin of the pileus a yellowish lustre at the edge; they are numerous, slender, thick and veined at the base,  $3\frac{1}{2}$  lines wide, slightly arcuate, bifid, branched, and much veined at the part which reaches the stem; short gills united entirely with their neighbours. Stem white, mealy, and with vein-like striæ near the gills, with a faint tinge of yellowish, or olive, at the foot.  $2\frac{1}{4}$  in. long, 1 in. thick, swollen at the apex, conically attenuated and curved at the base. The foot is pointed. Flesh firm, hard; odour not disagreeable."—*Secretan*.

Under oaks.

**R. heterophylla.** *Secr. No. 516.*

Pileus the foundation is of a yellowish white, tessellated, labyrinthed more or less finely, the little compartments charged with green spots, forming verdigris blotches, powdered. These are more marked in the centre, and their colour more pronounced in youth. They extend in a network more crowded at the margin, producing there a simple granulation. Finally the pileus becomes yellowish, with a deeper tint in the centre, a little shining, striate at the margin. The form hemispherical, centre a little depressed, then convex, and at length concave. Diam. 5 in. Flesh white, firm, 4 lines thick.

Gills, in infancy, with a faint tint of flesh-colour, then they become white, they are numerous, fragile in old age, 3 lines wide, their greatest width is about the margin of the pileus. Nearly all bifid on arriving at the stem. Short gills in a small number.

Stem dull white,  $2\frac{1}{2}$ -3 in. long,  $1-1\frac{1}{4}$  in. thick, solid, straight or curved, sometimes conic and attenuated at the foot, sometimes swollen with deformities (bumps), the tint is reddish at the base. Odour indifferent.

Obs. It is difficult for me to admit with Persoon that this species is the same as Paulet, t. 95, f. 9, 10, 11.—*Secretan*.

**R. virescens.** *Secr. 517.*

var. A. Pileus in the first state the centre is verdigris powdery, the point in the middle darker, the green tint with a tinge of whiteness at the margin. Then the centre is mottled or yellow, turning to orange, the sides remaining of a verdigris green, more or less light. It is dry, dull, powdery, delicately like cloth, but without granulations. Later a darker tint, rather large, extends to the margin, the centre remaining of a light colour. In old age the surface is smooth, and the verdigris passes to yellowish green. It is some time plane, depressed in the centre, and finally the margin is elevated. Diam.  $4\frac{1}{2}$ -5 in. Flesh white, not vinous under the

cuticle, firm, 5 lines thick. It descends irregularly into the gills.

Gills very white, numerous, firm, fragile, slender at the edge, often furcate, especially near the stem, sometimes anastomosing in the manner of cells. Their greatest width is 4-5 lines about the margin of the pileus, becoming narrowed on reaching the stem, where they are decurrent by a point.

Stem white, shining,  $3\frac{1}{4}$ -4 in. long, 11-12 lines thick, full, straight or curved, a little swollen at the summit, of equal thickness in the lower part. Odour none.

var. B. Diam.  $2\frac{3}{4}$  in. Stem  $1\frac{3}{4}$  in. long, 7-8 lines thick. Gills bifid, prolonged after their union in a slender plate, rounded at the back. The points of these plates alternate, one convex and returning, the other prolonged and decurrent, the extremities of the plates are twisted and interlaced as a network.

Obs. Amongst other differences the very numerous gills separate this species from *A. furcatus*.—*Secretan*.

**Russula (Rigidæ) lepida.** *Fries Epic. p. 355. Hym. Eur. 444. Sverig. Svamp. t. 59. Mon. II., p. 191. Sacc. Syll. 1816. Berk. Outl. 212. Stevenson B. F. II., 119. Cooke Hdbk. I., 623, II. 1202. Cooke Illus. t. 1072-1073. Hogg & Johnst. t. 4. Huss. II., t. 32. Lambotte Belg. 322. Gill. Champ. 235. Agaricus rosaceus, Kromb. t. 64, f. 19-20. Ag. sanguineus, Batsch Elen. f. 13 (minor).*

Mild. Pileus fleshy, compact, convex, then depressed, unpolished, rather silky, or rimosely-squamose, growing pale, margin spreading, obtuse, without striæ; stem solid, compact, even, white or rosy; gills rounded, rather thick, somewhat crowded, many forked, white.

In beech woods.

Very much resembling the following (*R. rubra*), but truly different. Edible. Pileus rather equally fleshy, blood-red rosy, disc always turning whitish. Flesh firm, but cheesy, not granular (grumous). Certainly *R. rosacea*, Pers. Obs., belongs to a firm species, without striæ; it is also mild.—*Hym. Eur. 444.*

Taste mild, edible. Large, wholly very compact and firm, but the flesh is cheesy, not granular. Stem 3 in. long, often 1 in. thick, even, white or rosy. Pileus nearly equally fleshy, convex, then expanded, scarcely depressed, obtuse, 3 in. broad, opaque, unpolished, surface spuriously silky, at length often cracking into scales, decoloured. Colour beautiful rosy blood-red, growing pale, becoming whitish principally at the disc. Gills rounded behind, rather thick, somewhat crowded, often furcate, connected by veins, edge, chiefly about the margin, often red, because the margin of the pileus is continuous with the gills, as also in *R. rubra*.—*Fr. Mon. 191.*

SPORES  $8-10 \times 6-8 \mu$  (Britz.),  $8-10 \times 6-8 \mu$  (Sacc.),  $10 \times 8 \mu$  (M. C. C.).

The following species of *Secretan* is referred here doubtfully by Fries :—

**R. roseo-granulatus.** *Secr.* 513.

var. A. Pileus bleached in the centre, washed with rose, more or less lively at the margin. It is subject to tessellate, the labyrinthine compartments becoming reddish, the rosy part is distributed in mealy patches. At length the colour sometimes gives the whole pileus a bistre tint. It approaches convex, the centre a little depressed, then plane, and finally concave, the margin festooned with a few striæ. Diam. 3 in. Flesh white, firm, 4 lines.

Stem white, compact, sometimes covered with a weak rose tint, 2 in. long, 6 lines thick, the summit thickened, as an arch, a little curved, and augmented at the base. It is soft in old age. This species is dry and solid.

Gills white, numerous, 3 lines, slender, straight or convex, leaving an empty space round the stem, with a sort of gorge (channel).

Under pines.

var. B. I found under pines a variety with the pileus entirely white and mealy, diam.  $3\frac{1}{2}$  in.; the flesh reached a thickness of 5 lines, the gills turning yellowish, the stem becoming wholly rose. We observed, in old age, the stem and gills with spots of jonquil yellow, very remarkable.—*Secretan*.

**Russula (Rigidæ) rubra.** *Fries Epicr.* 354. *Hym. Eur.* 444. *Mon.* II., 191. *Sverig. Svamp. t.* 49. *Berk. Outl. p.* 212. *Cooke Hdbk.* 1., No. 624, II., 1203. *Stevenson B. F.* II., 120. *Sacc. Syll.* 1817. *Gill. Champ.* 223. *Lambotte Belg.* 322. *Kickx. Fland.* 205. *Roq. Med. t.* 5, f. 2. *Agaricus ruber, Barla t.* 15, f. 1-10. *Krombh. t.* 65, *Ag. sanguineus, Vitt. Mang. t.* 38, f. 2. *Schæff. Icon. t.* 15, f. 4-6. *Ag. pulcherrima, Secr. Suisse No.* 506.

*Acrid.* Pileus fleshy, rigid, convex, then flattened or depressed, polished when dry, becoming even; margin spreading, obtuse, without striæ, hard, stout, varying from white to red; gills obtusely adnate, somewhat crowded, whitish, forked and dimidiate ones intermixed.

In woods.

Very hard, rigid, flesh somewhat grumous, very distinct. Pileus, by reason of its intense vermilion colour, almost shining, but it occurs, also growing pale, rather tan coloured, and cracking; disc commonly darker. Flesh under the cuticle red. Gills when old turning yellowish, the edge often red. *Secr. No.* 506. Poisonous.—*Hym. Eur.* 444.

Very acrid. Very hard and rigid, differing from the rest of the species in this tribe in the pileus being polished, becoming even,

although without pellicle, flesh somewhat grumous, and taste very bitter. Stem solid, even, varying from white to red, 2-3 in. long, 1 in. thick. Pileus compact, hard and fragile, convex, then plane, ordinarily depressed, absolutely dry, without pellicle, but polished, becoming smooth, of one colour, cinnabar-vermilion, but getting pale with age, tan-coloured, and often rivulose cracked, disc darker; margin spreading, obtuse, even, always persistent; flesh white, red under the cuticle. Gills obtusely adnate, rather crowded, whitish, then turning yellowish, mixed with forked and dimidiate ones. Spores whitish.—*Mon.* 192.

SPORES  $10 \times 8 \mu$  (Britz.), 8-10  $\mu$  (Karst.), 8-10  $\mu$  long (Bizz.), 8-10  $\mu$  (Sacc.).

var. **pallens.** *Bizzozero*, p. 56.

Pileus pale, otherwise same as the type.

The species called *pulcherrima*, by Secretan, and referred to this by Fries, is thus described:—

Pileus at first a fine red, shining and of one colour, it is then spherical, and sunk in the herbage. The colour is after of a cherry red, very bright, very dark rose, often dark purple at the centre. It is dull, covered with meal, which is distributed in a very fine granulation. Convex, then plane, at length concave. Diam. 4 in. Flesh white, granular, brittle, 6 lines thick, descending irregularly into the gills. It is red under the cuticle.

Gills white, getting yellowish at their superior extremity, but the edge is purplish, which is most visible near the stem, and the margin of the pileus 4 lines wide, the greatest width at the extremity of the pileus, and are very narrow near the stem. They are fragile, straight, or slightly convex, adhering after a short and deep return, furcate, anastomosing.

Stem white, streaked with rose tints, 3 in. long, 9-15 lines thick, straight or curved, swollen at the base, which terminates in a point. This plant is heavy, solid, and brittle. Odour strong, penetrating.—*Secr.* No. 506.

We have included the following as a variety of the present species:—

var. **sapida.** *Cooke Illus. t.* 1087, *Handbk.* II., No. 1203. *Agaricus atropurpureus*, *Krombh. t.* 64, f. 5-6.

Large, fleshy, plane (3-4 in diam.), then depressed, dark purple, shining, dry, or rather viscid in wet weather, margin quite entire, even; stem straight, solid, stuffed, white, somewhat cylindrical; gills fleshy, often furcate, broad, white, entire. Flesh white, firm, taste mild. (Spores 10  $\mu$  diam.).—*Krombh.*

Amongst grass.



This is referred by Fries to *Russula emetica*, but the persistently mild taste, absence of marginal striæ and other points separates it from that species. Pileus 3 to 4 in. diameter, with the appearance of our usual form of *R. rubra*. It is still somewhat doubtful whether it should be regarded as a variety or a distinct species. This will depend on individual estimate of the value to be attached to mildness or acridity.

**Russula (Rigidæ) Linnæi.** *Fries Epic. p.* 356. *Hym. Eur.* 444. *Mon.* II., 192. *Kickx. Fland.* 205. *Lambotte Belg.* 323. *Gill. Champ.* 235. *Cooke Hdbk.* II., 1204. *Stevenson B. F.* II., 120. *Cooke Illus. t.* 1026. *Sacc. Syll.* 1818.

Mild. Pileus everywhere fleshy, plane, then depressed, *polished, dry*, smooth; margin spreading, obtuse, without striæ; flesh spongy, compact, white; stem spongy, solid, stout, rivulose, red; gills adnate, rather decurrent, somewhat thick, white, turning yellowish, sometimes dichotomous and anastomosing behind.

In woods. Rare.

Habit exactly that of *R. emetica*, substance also floccose, but very compact, firm, thick; stem  $1\frac{1}{2}$  in. long, rather ventricose at the middle, and 1 in. thick, intense blood red (but varies also to white), obsoletely fibrillose-reticulate. Pileus without pellicle, of one colour, dark purple, blood red, etc., opaque, not becoming pale, 3-4 in. broad. Gills scarcely crowded, rarely connected by veins, a few dimidiate, divided behind. Spores whitish. Secretan, No. 490, appears to come near to this.—*Hym. Eur.* 444.

Splendid. Taste mild. Stem stout, firm but spongy, soft within, hollow,  $1\frac{1}{2}$  in. or more long, 1 in. or more thick, rather ventricose, obsoletely fibrillose-reticulate, in my specimens intense blood red. Pileus everywhere fleshy, rigid, plane, depressed, 3-4 in. diameter, sometimes repand, even, smooth, dry, without separate pellicle, of one colour, a beautiful deep blood-red or bright rose; margin spreading, obtuse, without striæ. Flesh thick, spongy, compact, white. Gills decurrent, rather thick, not crowded, broad, fragile, sparingly connected by veins, white, turning yellowish when dry, mixed with a few dimidiate ones, anastomosing behind. Spores white.—*Mon.* 193.

SPORES subglobose,  $11\ \mu$  (Quelet),  $8-10 \times 8\ \mu$  (Britz.),  $8-11 \times 8\ \mu$  (Sacc.).

As Fries, in his *Epicrisis*, refers Secretan's No. 490 both to this species and *Russula integra*, it is clear that it is not a good representation of either, and hence we have not included it here.

**Russula (Rigidæ) xerampelina** (Schæff.). *Fries Epicrisis* 356. *Fr. Hym. Eur.* 445. *Fr. Mon.* 192. *Gill. Champ.* 236. *Quelet Jura* 307. *Karsten Hatsvamp* 205. *Saccardo Syll.* 1821. *Stevenson B. F.* II., 121. *Cooke Hdbk.* II., 1205. *Grevillea* VI., 122. *Cooke Illus. t.* 1053, 1074. *Agaricus xerampelinus*, Schæff. *Icon. t.* 214-215. *Agaricus tinctorius*, *Secr. Suis. No.* 487.



Mild, pileus fleshy, compact, convex, then plane and depressed, dry, opaque, even, and *minutely cracked*; margin straight, even; *flesh compact, white, turning yellowish*; stem stout, firm, clavate, even, white, or reddish, at length spongy and soft; gills adnexed, rather crowded, furcate behind, white, then tan coloured.

In fir woods.

As *R. Linnæi* approaches *R. emetica* so this approaches *R. integra*, but differs in its firm substance, the cuticle of the pileus not being distinct, whereupon the pileus is always dry, and commonly rimosely punctate. The pileus is purple rose, the disc becoming pale, yellowish white. Spores dingy tan colour. Stem redder when moist.—*Hym. Eur.* 445.

*Taste mild.* Stem stout, firm, at length spongy within, soft, hollow, 2-3 in. long, 1 in. thick, usually thickened at the base, even, white, or reddish. Pileus fleshy, compact, convex, then flattened, at length depressed, 3 in. and more diam., *without a distinct pellicle*, always dry, opaque, even, but when old commonly very finely cracked, and *the cuticle under a lens is seen to be very delicately granulate or punctate*; margin patent, without striæ. Colour of the pileus variable, commonly *purple-rose*, with the disc growing pale, and becoming yellowish white, sometimes verging on olive. *Flesh compact, white, turning yellowish.* Gills adnexed, rather crowded, broadest in front, furcate behind, whitish, then becoming yellowish. Spores dingy tan colour.—*Fr. Mon.* 192.

SPORES  $8.9 \times 6.7 \mu$  (Britz.),  $8.9 \times 6.7 \mu$  (Sacc.),  $9 \times 8$  or  $9.10 \times 7.8 \mu$  (M. C. C.).

Pileus dull rose, mealy, the centre yellowish white, of a large size, the margin frequently of a bright rose, which is determined by the white of the centre, the rose tint of the margin is distributed in irregular spots. Diam.  $3\frac{1}{2}$  in. *Flesh white, 4 lines thick.* Gills becoming yellow at the base, which produces a changing appearance from white to yellow, 4 lines wide, slender at the edge, veined at the base, touching by a point, and tending to detach themselves from the stem. Stem very white, dull, mealy, sometimes in drying having a faint rosy tint, mealy especially at the apex, 2 in. long, 8 lines thick, swollen conically next the pileus, and curved. Solid and firm, the odour penetrating and agreeable.—*Ag. tinctorius*, var. B., *Secr. No.* 487.

The above description corresponds to the ordinary form which we have seen in this country, but the stem is very seldom at all tinged with rose, and when the mealiness disappears is often faintly striate. The disc sometimes remains darker than the rest of the pileus, not becoming decoloured or yellowish, but is always, more or less, speedily granular under a lens, from the breaking up of the cuticle.

Although described as not having a distinct pellicle, it is easy in damp weather to strip off the cuticle from the margin inwards for half an inch or more; beyond this it is truly adnate.

The colour of the pileus from the margin up to the decoloured disc varies in intensity as well as in tone. Sometimes the rose is replaced by lilac, almost violet, or, more commonly, by a light warm brown, tinged with purple or rose. The disc also deepens into orange or orange brown. Whatever the variations in colour may be, the breaking up of the cuticle into granules seems permanent, and distinguishes the species. It is more minute and of a different character to the cracking of the cuticle in *R. cutefracta*. When cut the flesh of the stem commonly turns foxy at the base, but no odour is distinguishable.—*M. C. C.*

We have never seen specimens which we could refer to either of the other two forms described by Secretan, as follows:—

***R. tinctoria.*** *Secr.*

Pileus when young of rather a finer rose colour at the margin, later on zoned with red, the centre dark, of a dull aspect. The general colour passes to a very bright purple, always opaque, then of a dark purple, mixed with yellow at the centre, and finally of a deep lilac, with a large yellowish-white centre. In form it approaches convex, with the margin perpendicular, and the centre prominent; at length the centre is depressed, and the pileus becomes plane. Diam.  $3\frac{3}{4}$  in. Flesh yellowish-white, firm, compact, 6 lines thick. Gills nearly white, then yellow, bright, numerous, rather fragile, 3-4 lines wide, their greatest width by the margin of the pileus. Many of them are furcate, and branched behind near the stem. Stem white,  $2\frac{1}{2}$  in. long, 9-11 lines thick, straight, or slightly curved, thickened below, at first very hard, then becoming soft, and at length hollow. What is very remarkable is that the plant in the young state throws off water, which leaves a tint of beautiful rose.—*Secr.* 487A.

***R. pallida.*** *Secr.*

Pileus dull-white, with faint tints of rose, which pass into light violet. For some time plane, then concave, the margin turned up. In dry weather the surface is broken in the form of large scales, and the margin deeply split. Diam.  $4\frac{1}{2}$  in. Gills white, beginning to turn yellow at the circumference, and at length becoming yellow, rather numerous, 5 lines wide, straight, or following the inflection of the pileus, distant from the stem. Stem dull-white, with a rosy tint at the apex,  $1\frac{1}{2}$  in. long, 9 lines thick, swollen above and below, and rounded at the base. At first solid, then becoming soft.—*Secr.* No. 487C.

Gillet has a variety called *rubromarginata*, from the edges of the

gills assuming a red tint, but this can hardly be considered more than a "form."

**Russula (Rigidæ) olivacea** (Schæff.). *Fries Epier.* 356. *Fr. Hym. Eur.* 445. *Sacc. Syll.* 1824. *Cooke Hdbk.* II., 1206. *Stevenson B. F.* II., 121. *Cooke Illus. t.* 1041. *Gill. Champ.* 236. *Agaricus olivaceus*, Schæff. *Icon. t.* 204.

Mild; pileus fleshy, convex, then flattened and depressed, rather silky and squamulose; margin spreading, even, flesh white, then somewhat yellowish; stem firm, ventricose, pale rose or pallid, internally spongy, stuffed; gills adnexed, broad, yellow, mixed with shorter and furcate ones.

In mountain fir woods. Rare.

Allied to *R. rubra*, but stem definitely spongy, pileus unpolished, gills soft and brightly coloured; certainly distinct; corresponding to *R. alutacea*. Colour of the pileus from dingy purple to olive, or altogether tawny-olive. Spores yellow.—*Hym. Eur.* 445.

SPORES globose,  $10\ \mu$  (Quelet),  $10\ \mu$  (Sacc.).

Fries in *Hym. Eur.* refers the following, from its habit, to the present species.

Pileus approaching a mixture of olive, of green, and of dark brown, the injured places obtaining purple tints; at other times the first tint is deep olive green, of one colour, dull, like cloth; later, sometimes it remains olive, greyish at the margin, more deep at the centre, sometimes it turns a light purple at the margin, darker at the centre, sometimes it becomes all dark crimson. Finally the middle offers a yellowish mixture, which in old age is blanched; the aspect is dull, as if mealy. The first form is convex, the summit flattened, the margin folded beneath, widens, becomes plane, and then a little concave; diam. 6 in. Flesh white, taking at last yellowish tints, vinous under the cuticle. It is rather soft in the interior, but it is enclosed in a stem with a sort of firm bark, thick and hard when young. The thickness of the flesh of the pileus is 9 lines; it enters into the gills.

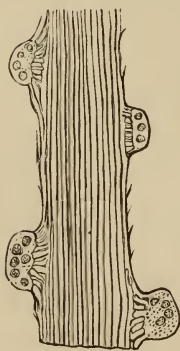
Gills for some time with a yellowish lustre, finally ochre-yellow, shining; they are almost crowded, and appear numerous; they prove remote in old age; they follow the contour of the pileus, are adnate at the same level, and are easily bifid at that point, 6 lines wide, and preserve the same near the margin of the pileus, very fragile, soapy to the touch.

Stem washed with a fine rose. This tint, which appears in youth near the gills, extends afterwards through the whole stem; it is more pronounced on one side than the other ( $2\frac{3}{4}$  in. long, the thickness of a good thumb). Straight, or a little curved, swollen above in old age, sometimes a little ventricose about the base, ordinarily attenuated, and slightly curved at the foot, holding the odour of the fir. In dry seasons the pileus cracks into deep fragments, which show the white flesh.—*Secr.* 489.

# RECENT OBSERVATIONS OF DR. NYLANDER ON SCHWENDENERISM.

TRANSLATED BY THE REV. J. M. CROMBIE, F.L.S.

In his "Sertum Lichenææ Tropicæ e Labuan et Singapore," just published Nylander (pp. 31-34) makes the following pertinent and important observations on this subject, which I have translated for the benefit of the readers of "Grevillea":—There is nothing easier for the refutation of the Schwendenerian hypothesis than observing the formation and evolution of the gonidia in the thalline granules, which are adnate on the erect chondroid axes of *Stereocaulon* and the *Cladoniei*. I have elsewhere shown (Lich. Fueg., p. 30) that these podetial axes constitute in the chondrohyphal portion a firm, erect cylindrical hypothallus, upon which, and from which, originate the myelohyphæ (which are nothing else than the chondrohyphæ seceding or segregated from the axis) with the glomerules of the thallus itself, which are composed of the medulla, gonidia, and at the same time of the cortex or cortical cells. These glomerules are variously explicated, and become at length for different types—granulose, squamulose, papillose, or fibrillose. But in their first grannliform beginnings an excellent opportunity is always found of observing the origin of the gonidia, which one may see in the act of growing. It is at the same time to be noted that the gonidiogenous thalline glomerules occur scattered upon the naked axis of the podetium where no gonidia are vagrant, so that none such can consequently come from without. Nor could they come from the substratum or the ground except by creeping up the erect cylinder of the axis—a movement impossible for them since they are entirely destitute of any kind of organs of ascension. We can, however, clearly see that the gonidia arise, and are formed in the cells of the said glomeruli.



The annexed figure shows four young glomerules growing upon a fragment of the naked stipe of a *Stereocaulon*, sufficiently demonstrating that the gonidia are produced in these glomerules. It is thus scientific matters are expressly to be proved by the results of accurate observations; but such as rest upon hypothesis only, or affirmation only (nowadays called "suppositions, convictions," etc.), are of no value, of no serious weight, are to be regarded as worthless.

We may notice and compare what Tulasne obtained by culture (Mem. Lich. t. xi., f. 17, "Thalle naissant," and t. xiii., f. 5-13), which affords a most true, most sincere, and most complete example of the germination of the lichen-spores, proceeding from the spore to the formation of the gonidia within the cellular prothalline glomerules, which he thus indicates in the explanation



of the table : " Des groupes de cellules, dont quelques-unes seulement, plus grosses que les autres, contiennent de la chlorophylle et des filaments, sur lesquels ces cellules ont pris naissance " (Cfr. Nyl. Fueg., p. 32-33).

The same I have formerly declared (Flora, 1885, p. 30) is to be observed in the formation of gonimia in the cephalodia of some *Stercocaula* in an analogous condition. The Schwendenerians attribute a singular intelligence and very subtle perspicacity to the germs of lichens, for in these germs, according to their opinion, there is inherent a faculty of selecting special "algæ," which they may be found surrounding, attracting and introducing into their textures that they may become *gonidia*. And as each lichen has its own proper gonidic type, it follows that there is need of a marvellous subtilty and judgment that that sole necessary type be not mixed up with another, and that in its place there be not admitted another incongruous "algal." But "majora canamus," the gonidic adult lichen, would rejoice in a still more subtle diagnostic faculty, for in the case of not a few species it would also have set before it the seeking out and snatching to itself its own "algal"—not, indeed, a gonidiomorphous "algal" (for such it already possesses), but an additional syngonimic algal, in order that cephalodia may be formed, in whose texture there occur gonimia or syngonimia as a peculiar anatomical system, composed in certain species by *Nostoc*, in others by *Scytonema*, and in others by *Sirosiphon*. (Fries fil., in discovering and pathologically explaining the history of these, has wonderfully distinguished himself, but *vide* Nyl. Lapp. Or., p. 117.) All of these things have, indeed, subtilly to be weighed and discerned by the lichen, bringing forth cephalodia, in order that there may be no mistake in the selection. Thus, after its first infancy, a lichen would seem to have obtained a more acute intelligence, along with an incomparable shrewdness in subjoining to itself, as symbiologists think, algal elements of the same sort. The necessary syngonimia upon the ground, on stone, or on bark would then be laid hold of by the hyphal tentacles (endowed with a magical power) of the lichen there expanded, and would be intruded where a place in the cephalodic fabric was predestined. The Schwendenerian fabulists would have it to be so, although certainly nobody ever saw, and certainly never will see, anything of the kind. But a still graver consideration stands in the way, if you set about explaining in what way those syngonimia come to *fruticulose* lichens. For in this case "algæ" would run to them, not from the nearest substratum, but from afar, leaping or flying through the air; every other way, every other method, fails. Exotic *Stercocaula*, often five inches in height, adorned with cephalodia in the upper portion of the fruticle, could by no other mode, from the substratum or the vicinity, seize or receive these "algals" in the places of the podetia where they are present; nor have the cephalodia a syngonimiose communication among them-



selves, nor are syngonimia anywhere visible in the stercocauline thallus or podetia, unless in the cephalodia themselves. And there remains to be explained the very difficult operation of penetration into the textures. All these allegations belong to inept Schwendenerism, and scarcely deserve even to be reviewed and castigated, so puerile are they—the offspring of inexperience and of a very light imagination. No true science is there.

I have previously shown that all the Schwendenerian “Algæ” are lichens, and entirely of a lichenose nature. (*Vide* Lich. Japon., pp. 100-111.)

In addition, a philosophical consideration stands prominently forth in this question, viz., that the types of gonidia and gonimia are systematically in all parts conjoined with the types of the species to which they belong. And, indeed, we see that a good many lichens present an intimate connection—gonidic, and, at the same time, gonimic, the types being constant, so that they may be regarded as bound to a double Schwendenerism. The systematic congruity which is always present in the thalline texture of every lichen between the gonidia and its other anatomical elements, expressing its own common character in the systematic series jointly in each species, repudiates and absolutely refutes all Schwendenerism. And not otherwise systematically do the spermogones in lichens, constantly connected with their thalli, demonstrate a parallelism, everywhere organic and perfect, with their apothecia; and in a systematic respect the spermogones are evidently of equal weight with the former (*vide* Nyl. Lich. Fret. Behring, p. 77), and accordingly cannot be conceived of otherwise than as male organs. Thus the gonidia, apothecia, and spermogones, formed by a common genesis, constitute necessary and essential organs of every lichen. A lichen exists solely through their genetic and organic unity. Those who there discern a “Fungus” and “Algal” imagine mere fables.

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# Grevillea.

A QUARTERLY RECORD OF CRYPTOGAMIC BOTANY  
AND ITS LITERATURE.

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## AUSTRALIAN FUNGI.

BY M. C. COOKE.

(Continued from p. 36).

### **Ustilago confusa**, *Massee*.

Sori produced in the ovary, soon naked, mass of spores pulverulent, violet-black; spores clear brown, with a tinge of violet by transmitted light, epispore about  $1\ \mu$  thick, perfectly smooth, subglobose, or irregularly angular ( $11-14\ \mu$ ).

On *Panicum paradoxum*. Victoria.

Previously confounded with *Ustilago destruens*, from which it is distinct.

### **Læstadia Litseæ**, *B. & Br.* (Sphærella).

Spots irregular or suborbicular, on the upper surface, becoming pallid, with a broad brown border. Perithecia semi-innate, black, punctiform. Asci clavate. Sporidia elongated, elliptical, continuous ( $20-30\ \mu$  long), hyaline.

On leaves of *Litsea*. Queensland.

### **Sphæropsis numerosa**, *Cke. & Mass.*

Gregarious; perithecia semi-immersed, or nearly superficial, globose, black, becoming flattened; sporules elliptical, continuous, brown,  $15 \times 8\ \mu$ .

On dead bark. Dimboola. Victoria. (*Reader*, 16.)

### **Asteromella homalanthi**, *Cooke & Mass.*

Spots suborbicular, on both surfaces, fuliginous (1 c.m. diam.); dotted with the minute black punctiform superficial perithecia. Sporules elliptic, hyaline ( $5 \times 3\ \mu$ ).

On leaves of *Homalanthus populifolius*. Queensland. (*Bailey*, 923.)

### **Melophia leptospermi**, *Cooke*.

This was published under the name of *Melophia phyllachoroidea*, Cke., but since discovered that the specific name is preoccupied by Spegazzini.

## EVOLUTION OF PLANT-LIFE.\*

"The aim of the present book is to briefly indicate, in a broad sense, the most pronounced features—structural and physiological—that characterize plant-life, as manifested at the present day, coupled with an attempt to trace the evolution of existing forms from primitive types, and to illustrate the interdependence between plants, animals, and inorganic nature."

Thus much we learn of the scope of the work before us from its preface, whilst the title informs us that the illustrations of plant-life are confined to the "lower forms." The first chapter is devoted to introductory matter, which is followed by chapters on Mycetozoa, Algæ, Lichenes, Characeæ, Muscineæ, Pteridophyta, and Phanerogamia—the latter being limited to about four pages of definition. At first it might be supposed that the use of the word Mycetozoa, in preference to Myxomycetes, indicated a decided leaning towards the "animal nature" of the organisms included under that term, but such is not the case, for it is stated that "the spontaneous movements exhibited by the swarm spores are not supposed to prove their animal nature, as similar motile cells occur in seaweeds, mosses, and ferns. During the reproductive phase the whole of the differentiation exhibited is in the direction of plant-life, in a rudimentary form, as would be expected."

Curiously enough Fungi are not mentioned in the synopsis at the head of the chapters, and yet fifty pages are devoted to them, at the end of Chapter III., which stands in the table of contents as "Algæ," whereas Algæ are treated of in the first portion of the chapter, and Fungi in the latter. We have no intention of pursuing an analysis of this handy little volume, but simply to indicate its scope and aim. Of course all the suggestions as to the evolution of the various groups are matters of opinion, and might be open to discussion, but as they induce thought and reflection, will serve a useful purpose. "The Fungi are considered as having descended by degeneration from the Algæ, and for this reason are placed immediately after the last mentioned class, although in reality they must be considered as a side and terminal group, not connecting with any higher type of plant development."

As a preliminary to the study of the Cryptogamia this volume will be welcomed, although the subjects are not equally balanced, since Algæ and Fungi take up 100 pages, with only five for the Mycetozoa, and 40 pages for the residue of the Cryptogamia. We think there is need for a larger and more exhaustive introduction to the study of the different groups of the Cryptogamous plants.

\* "The Evolution of Plant-Life, Lower Forms," by G. Massee (University Extension Series). London: Methuen and Co., 1891.



## HIMALAYAN TRUFFLES.

Some kind of truffle has, for many years, been known to grow at the base of the Himalayas, and probably more than one kind, yet, strangely enough, none have ever been sent to Europe for identification. Year after year we have sent requests to the North West Provinces for a specimen or two of the indigenous truffle. It was only a few days since that the long-hoped-for parcel made its appearance. The natives know the truffle under a native name, and they are fully aware of its esculent qualities. It has even been stated that they are sold occasionally in the bazaars, but, if so, it is remarkable that none were ever sent with the large consignments of raw products to the various exhibitions in Europe, from 1851 to the present. On this point we can speak with some confidence, from our official connection with the Indian Department for above a quarter of a century. Through the kindness of Mr. Duthie, of Saharanpore, we have seen our first Himalayan truffles, and although in books a haphazard guess has been made of the species, by calling it either *Tuber æstivum* or *Tuber cibarium*, it proves to be neither the one nor the other, but more closely allied to the French truffle, *Tuber melanosporum*, but much smaller, and with sporidia scarcely more than one-half the size, and, indeed, the sporidia are much smaller than in any other of the species with aculeate sporidia.

Under these circumstances we have been compelled to recognize the Indian as a distinct species, under the name of *Tuber indicum*, of which a description is annexed.

The truffles, in the dried condition in which we received them, do not exceed an inch in diameter, and many are not half that size. They are possibly nearly globose when fresh, but in parting with moisture become more or less irregular, depressed, and lobed. The outer surface is sooty-black, covered with angular five or six-sided warts, smaller than in the common truffle. The interior is blackish, with whitish sinuous veins, so that it is irregularly mottled. The asci are nearly globose, and appear normally to enclose four sporidia. These sporidia are elliptical and brown, densely covered with rather long truncate spines, or warts. In this latter feature they agree with the sporidia of *Tuber melanosporum*, but the difference in size is very characteristic. We do not recognize any particular odour.

***Tuber (Oogaster) indicum*, Cke. & Mass.**

Globosum, irregulare (plerumque 2-3 c.m. diam.), verrucis subhexagonis asperatum, fuligineo-nigrum; gleba carnosae, nigrescente, venis albidis gyrosis marmorata; ascis subglobosis, 2-4 sporis; sporidiis ellipsoideis, dense longeque aculeatis, minimis, brunneis ( $15-18 \times 10-12 \mu$ ), aculeis apicem truncatis.

In the ground. Mussooree, N.W. Himalayas. (*Duthie.*)

## RUSSULA REDIVIVA.

(Continued from p. 59.)

### HETEROPHYLLÆ. *Fries Hym. Eur.* 446.

Pileus fleshy, firm, with a thin margin, which is at first inflexed, then expanded and striate, covered with a thin adnate pellicle. The gills consist of many shorter mixed with the longer ones, along with others which are forked. Stem solid, stout, spongy within.

**1209. *Russula (Heterophyllæ) vesca.*** *Fries Epic.* 352. *Hym. Eur.* 446. *Mon. Hym.* 193. *Stevenson B. F.* II., 122. *Cooke Hdbk.* No. 1209. *Cooke Illus. t.* 1075. *Hussey I., t.* 89. *Fries Sver. Svam. t.* 63 (a receding form). *Berk. Outl.* 211. *Sacc. Syll. No.* 1827. *Bresad. Trident t.* 95.

*Mild, sweet-tasted.* Pileus fleshy, firm, umbilicato-convex, then plane and infundibuliform, *venoso-rugose*, and streaked; *reddish flesh colour, disc darker*, flesh under the viscid cuticle reddish; margin even, or remotely striate; stem firm, unequal, *reticulate-rugose*; gills adnate, rather crowded, unequal, and forked, white, as well as the stem.

In woods. Esculent. Flesh white. Taste mild, pleasant. *Fr. Hym. Eur.* 446.

Stem solid, compact, externally rigid, reticulated-rugose in a peculiar manner, sometimes attenuated at the base, white. Pileus fleshy, rather firm, plane, depressed, rugulose-veined, with a viscid pellicle, red flesh colour, with the disc darker, margin at length spreading. Flesh cheesy, firm, white. Gills adnate, crowded, thin, white, many unequal and furcate intermixed, but scarcely connected by veins. Of medium size. Taste mild, pleasant, reckoned edible.—*Fr. Mon. p.* 193.

SPORES minutely echinulate, subglobose, 7-8  $\mu$  (Bres.).

Fries has referred none of Secretan's descriptions to this species. It is not always easy to distinguish this from *R. cyanoxantha*, but the disc is usually darker than the margin, whereas in the latter the disc becomes pale. In *R. vesca* the stem is commonly rugose or reticulated, whilst in the other species it is even. We have not recognized any blue or green colouring in the pileus of *R. vesca*, although usual in *R. cyanoxantha*. There is sometimes a crab-like odour, and the flesh is liable to become brownish when bruised. In some respects *Russula du Portii*, Phill., is allied to this species.—*M. C. C.*

**1210. *Russula (Heterophyllæ) lilacea.*** *Quel. Bull. Soc. Bot. Fr.* 1876, t. II., f. 8. *Cooke Hdbk.* II., 1210. *Cooke Illus. t.* 1054. *Sacc. Syll. No.* 1828.

Pileus convex, then depressed, rather fleshy, viscid, violet or purple, margin growing pale, striate (5-8 c.m. diam.), flesh violet

under the cuticle ; stem spongy, corticate, fragile, pruinose above, rosy at the base, gills distant, ventricose, white, connected by veins.

In moist woods. Odour faint, pleasant ; taste mild.

We have only met with this species two or three times, which agrees in some features with *R. vesca*, but with the margin striate ; this is also sometimes faintly traced in *R. vesca*. The stem is softer, and more spongy, usually attenuated and rosy below, but white and pruinose above. Whether it will be maintained as a distinct species depends upon a more extended acquaintance, but it certainly differs in habit and appearance.—*M. C. C.*

**1211. *Russula (Heterophyllæ) azurea.*** *Bres. Fungi Trid. t. 24.*  
*Cooke Hdbk. II., 1211. Cooke Illus. t. 1088. Sacc. Syll. 1845.*

Pileus fleshy, convex, then plane or depressed, soon dry and even, constantly minutely granulose, margin scarcely striate, bright blue, margin sometimes lilac, growing pale, cuticle separable (4-6 c.m. diam.), stem white, ventricose, or clavate at the base, smooth, rugulose, rather firm, spongy, a little hollow when old (4-5 c.m.  $\times$  10-15 m.m.), flesh white, mild ; gills crowded, equal, attenuated behind, adnexed, and bifid, white, unchangeable.—*Bresadola.*

In fir woods.

In former times this little species was undoubtedly, in this country, included under *Russula heterophylla*, with which it still seems to be more closely allied, or *Russula cyanoxantha*, than with *R. emetica* and other species of *Fragiles*. When fresh the pileus is covered with a delicate "bloom" like that of plums.—*M. C. C.*

SPORES  $9 \times 8 \mu$ .

**1212. *Russula (Heterophyllæ) cyanoxantha.*** *Schæff. Ic. t. 93.*  
*Fr. Hym. Eur. 446. Fr. Mon. p. 194. Sacc. Syll. 1829. Paul. t. 76,*  
*f. 1-3. Stevenson II., 122. Cooke Hdbk. II., 1212. Cooke Illus. t.*  
*1043, 1076, 1077. Kromb. t. 67, fig. 16-19. Vittadini t. 27.*

Mild, pileus compact, convexo-plane, then depressed or infundibuliform, viscid, *variegated*, margin rather blue, at length faintly striate, stem spongy, stuffed, *even*, smooth, white, gills rounded behind, broad, mixed with shorter ones, and furcate, white.

In woods. Beech, etc.

Flesh firm, cheesy, commonly reddish under the separable pellicle. Colour peculiar, from lilac or purplish, greenish-olive, disc commonly growing pale, sometimes turning yellowish.—*Fr. Hym. Eur. 446.*

Taste mild, pleasant, allied to *R. vesca*, but the colour of the pileus in that species is immutable, in this it is variable, and on other points constantly different. Stem spongy, stuffed, but firm, when old sometimes hollow, 2-3 in. long, to 1 in. thick, equal,

smooth, even, white. Pileus compact, convex, then plane, then depressed or infundibuliform, 2-3 in. broad and high, now even, now rugose, or virgate, viscid, margin deflexed, then expanded, remotely and faintly striate, colour of the pileus mutable, in typical form from lilac or purpurent to olive-green, disc commonly growing pale, sometimes yellowish, margin commonly turning bluish or livid purple. Flesh firm, cheesy, white, reddish under the separable cuticle. Gills rounded behind, connected by veins, less crowded, broad, furcate, unmixed with shorter ones, white. Varies when old, with the pileus pallid, greenish-white, or mixed with a purple colour.—*Fries Mon.* 194.

SPORES 8-10  $\times$  6-8  $\mu$  (Britz.), (Sacc.), 10  $\mu$  diam. (M. C. C.), 9-8  $\mu$  (M. C. C.).

Fries has referred the following forms from Secretan to the present species.

**R. cyanoxantha.** *Secr. No.* 520. *Schæff. t.* 93. *Bolt. t.* 1 (*Fig. sup.*). *Pers. Sym. p.* 445.

var. A. Pileus in youth slate-grey, dull and deep; it takes then at the margin a variable, undecided tint, between greenish, bluish, and purple. The centre shows purple patches in youth, and orange when the plant is old. At this epoch the sides turn greenish. The surface is covered with a fine hairiness. It approaches hemispherical, the centre in good time depressed. It shows then often lobed and divided by a deep groove, like one sees in peaches. It becomes successively convex, plane, the edges folded under, the centre sunken, then concave, the margin split deeply. It is soon eaten beneath by insects. Diam. 5 in., 5 lines thick. The cuticle is raised easily. Flesh white, firm, vinous under the skin.

Gills white at all ages, numerous, fragile, nearly all furcate at different lengths, nearly convex, then slightly arcuate or straight, adnate by one bifid extremity, a little decurrent, 3 lines wide, with a few short gills.

Stem white, almost shining, 3½ in. long, 9-10 lines thick, cylindrical, hard, slightly thickened at the apex and the base, sometimes a little compressed. It takes spots coloured red-brown. The foot is recurved and pointed. The odour a little agreeable.—*Secr. No.* 520.

var. B. This variety is intermediate between the variety A and *Ag. furcatus*.

Pileus, the tint is always very deep, the colour of dark purple at the margin and the centre; in old age the purple gives place to a deep green. The applied chevalure forms a network of crowded meshes, blackish, shining, and which does not prevent the surface being very smooth and a little viscid. The flesh becomes vinous to a considerable depth.

Gills, 5 lines wide, are flabby, and easily reduced to a paste.



The stem, curved, ventricose, is attenuated at the base, it is pure white.

Under firs. July, August.

Obs. We distinguish this species from *A. lividus* (No. 521) especially by its colour in infancy, and by the purple tints of the centre, which do not exist in any other species. When it becomes greenish in old age care must be taken not to confound it with *R. furcata*, from which it is distinguished by the numerous gills and their flabbiness.—*Secr. No. 520.*

The species above called *A. lividus* is most probably *R. heterophylla*.

**R. vaga.** *Secr. No. 523.*

var. A. Pileus approaching light purple, mixed with olive, dull, then deep purple red, the centre greenish olive. It is some time plane, finally a little concave, umbonate in the centre. Diam. 3 in. It is at length shining, a little viscid, margin striate and tuberculose. Flesh white, rather firm, 4 lines thick, conical, vinous under the cuticle, which is easily raised.

Gills white, numerous, slender, fragile, straight, adnate, 3 lines broad, united by numerous anastomoses, and serpentine in old age. A few short gills.

Stem covered in its length with a purple tint, swollen insensibly at the base,  $2\frac{1}{2}$  in. long, 7-8 lines thick, up to 1 in. Striate with fine whitish streaks. It becomes flabby, and yields to pressure. Odour agreeable and penetrating.—*Secr. No. 523.*

var. B. Differs in its earlier stage, dull olive and convex; it takes afterwards the same tints as the preceding. Finally it is discoloured entirely, and the margin is covered with striæ. The gills remove from the stem, fairly passing as free.—*Secr. No. 523.*

var. C. Pileus in infancy all green, centre darker, afterwards the deep olive centre admits in the middle a tint darker and shining, the sides purple, becoming deep purple, the centre turns to green, mixed at last with yellowish. It approaches convex; the middle, sometimes raised to a rather large boss, is depressed. The pileus becomes in time plane, and then concave, the margin striate and tuberculose at the extremity. Diam. 3 in. Flesh white, 3 lines thick.

Gills dirty white, veined at the base.

Stem 7 lines thick, thickened and deformed at the base, soft, and then hollow. For all the rest the gills and stem resemble those of var. A. The odour is also the same. It is most delicate and fragile.—*Secr. No. 523.*

var. D. It differs from the preceding in its smallness, its diam. not exceeding 2 in. It becomes in old age all black.—*Secr. No. 523.*

Fries does not mention whether he regards all the above forms as



referable to *Russula cyanoxantha*, as some of them seem to approach *R. vesca*.—*M. C. C.*

Berkeley, in a note, says: "I do not think Fries is right in quoting Krombh. t. 67, Figs. 16-19; the figures do not give me a good idea of this species."

**1213. *Russula (Heterophyllæ) heterophylla.*** *Fr. Hym. Eur.* 446. *Fr. Mon. p.* 194. *Sacc. Syll.* 1830. *Stevenson* II., 123. *Cooke Hdbk.* II., 1213. *Cooke Illus. t.* 1044, 1045. *Berk. Outl. t.* 13, f. 5.

Mild, pileus fleshy, firm, convexo-plane, then depressed, even, polished, with a very thin pellicle, margin thin, even, or densely and finely striate, flesh white, stem solid, firm, nearly equal, even, gills attenuated behind, reaching the stem, *very narrow, much crowded*, furcate and dimidiate, white.

In wooded pastures amongst moss.

Pileus from the thin pellicle rather viscid or dry, never becoming red, nor rugoso-virgate, gills crowded, stature commonly shorter and smaller than *Russula cyanoxantha*, differs from *R. virescens* in the thin margin, narrow gills, indeed very narrow. Apex of the stem dilated, so that the gills appear remote. Never seen it red.—*Fr. Hym. Eur.* 446.

Taste always mild, as in *R. cyanoxantha*, from which it differs in size, pileus thinner, even, never reddish or purplish, thin, pellicle closely adnate, stem firm, solid, gills thin, *very narrow, much crowded*, white, mixed with many dimidiate and furcate.—*Fr. Mon.* 194.

SPORES  $5 \times 7 \mu$  (W. G. S.),  $6-7 \times 5-6 \mu$  (Bizz.),  $6-7 \times 5-6 \mu$  (Sacc.).

Fries refers to this species the following numbers of Secretan, 521, 522, 526, etc.

***R. livida.*** *Secr. No.* 521.

var. A. Pileus when young variegated with grey, yellow and purple; colours very bright; surface polished and moist; later the colours are more pronounced. The centre becomes greenish yellow, olive, and very brownish; the purple often of a fine tint, reaches the margin. It appears not of a strong green, nor dark purple in old age. It becomes a little viscid. The form approaches hemispherical, umbonate, then convex, the margin folded and sinuous, the centre umbilicate (for a good time), the margin is not striate. Diam. 6 in. Flesh white, vinous under the cuticle, solid, 6 lines thick.

Stem very white, compact, 3 in. long, 1 in. thick, curved, pointed, and a little compressed at the base. Odour disagreeable.

Gills very white, numerous, serrate, slender, bifurcate at divers lengths. It becomes bifid and a little decurrent at the pedicel, they are veined at the base (soft), and possible to be reduced to a paste when crushed, 3-4 lines broad.

Very common, remarkable for its heaviness.—*Secr. No.* 521.

var. B. Pileus with the margin bright green, mixed with whitish at the centre, the purple and green deeper, finally dark green and shining at the centre, bright green at the margin, the green tint distributed about the edge in little granular patches. It is viscid in the centre. The form is for some time concave at the disc, the margin at first reversed, and then straight. Diam.  $3\frac{1}{4}$  in. Flesh a little vinous under the skin. Stem white,  $2\frac{1}{2}$  in. long, 1 in. and more thick, compressed, ventricose indented, becoming hollow, fragile. Gills numerous, slender, flabby, very often forked, and reticulate about the stem,  $2\frac{1}{2}$  lines broad.—*Secr.* 521.

Under firs. September.

var. C. Centre of the pileus brown, surrounded by orange, the margin bright greenish, smooth and shining. It is flat, depressed in the centre, with the margin a little turned up. Diam.  $3\frac{1}{2}$  in. Flesh cheesy, descending into the gills, firm, but brittle. Stem 3 in. long, 10 lines thick, rather ventricose, attenuated at the base. It is remarkable for a bright purplish tint. Gills white, numerous, not anastomosing.—*Secr.* 521.

var. D. The margin of the pileus takes faint purplish tints, the surface powdery and smooth, the flesh vinous under the cuticle, 4 lines thick. Stem 3 in. long, 7 lines thick, attenuated at the apex, bent, a little swollen at the base, catching a faint purplish lustre at the middle. Gills 2 lines broad.—*Secr.* 521.

Among grass under firs. August.

***Russula angustata.*** *Secr. No.* 522.

Pileus when young dark purple, sunk in the ground, afterwards the centre becomes olive grey, and the margin remaining purple; it is glossy, viscid especially at the margin. When old it is bright violet, or otherwise it will take large spots of that colour; from convex it will have the centre depressed, or turn out plane, the centre remaining sunk, and finely wrinkled, the extremity of the margin striate and tuberculose. Diam.  $2\frac{3}{4}$ -3 in. Flesh white, cheesy, 4 lines thick.

Stem white,  $1\frac{3}{4}$ - $3\frac{1}{2}$  in. long, 8-12 lines thick, thickened in the middle, curved and attenuated at the base, a little shining; it seems hollow in old age; the flesh resembles that of the pileus. Odour a little pleasant.

Gills white, very numerous, slender, flabby, almost glutinous, forming a greasy pulp (1 line wide); they become thinner singularly on approaching the stem. They are veined at their base, straight, adherent and furcate about the stem.—*Secr. No.* 522.

Found in July.

***R. chlora.*** *Secr. No.* 256.

Pileus yellowish fawn, light, sides slate, in old age turning to greenish, smooth, dry. Its adult form is plane. Diam.  $3\frac{1}{2}$  in. Flesh white, firm, 5-6 lines thick, margin deeply split.

Gills white, numerous, rather slender, straight, adnate, 3 lines

wide, especially bifid on attaining the stem, with many short gills.

Stem white,  $2\frac{1}{4}$  in. long, 9 lines thick, straight, nearly of equal thickness, a little curved and pointed at the foot, which becomes reddish. Flesh full. Odour a little agreeable.—*Secr.* 526.

Under beech. End of June.

var. B. Pileus of a grey tint, with yellowish and greenish, shining, the gills convex,  $3\frac{1}{2}$  lines. Stem swollen at the apex.—*Secr. No.* 526.

Undoubtedly *Russula heterophylla* has been constantly confounded with *R. cyanoxantha*, from which it is primarily distinguishable by the *very narrow* and more crowded gills. It is by no means a common British species. Badham's figures, and some others, clearly belong to *R. cyanoxantha*. It is hopeless to attempt to separate the two species in the descriptions given by the older authors.—*M. C. C.*

**1214. *Russula (Heterophyllæ) galochroa.*** *Fr. Hym. Eur.* 447. *Fr. Mon.* 195. *Sacc. Syll.* 1831. *Stevenson II.*, 123. *Bull. t.* 509, f. L. *Cooke Hdbk.* II., 1214. *Cooke Illus. t.* 1089.

Smaller than *R. heterophylla*, pileus at first milk white, then becoming greenish, rarely with scattered floccose white spots.

Under birch.

Margin even, or slightly striate. Flocci of the disc spot-like or wart-like.—*Fr. Hym. Eur.* 447.

Chiefly in birch woods. Stem solid, firm, 1-2 in. long,  $\frac{1}{2}$  in. thick, never becoming reddish. Pileus rather plane, viscid in moist weather, commonly dry, white, turning greenish, even, and sometimes sprinkled with floccose white spots, margin faintly striate. Gills rather thin, more or less furcate and unequal.—*Fr. Mon.* 195.

"The flocci at the disc, in the form of spots or warts, are not like those of *R. virescens*."—*Stevenson*.

Although not cited by Fries, the following is Secretan's description :—

**A. galochrous.** *Secr.* 535.

var. A. Pileus milk white, yellowish white, dull, convexo-plane, becoming plane,  $2\frac{1}{4}$  in. diam., margin without striæ. Flesh white, 4 lines thick, firm, hard.

Gills white, changing to the eye to yellowish, slender, numerous, veined at the base, convex, adnate, 2 lines wide, a few short gills.

Stem white, 2 in. long, 6 lines thick, a little shining, curved, swollen at the foot, which ends in a point. Flesh same as the pileus. Odour indifferent.

var. B. Larger, presenting at the sides slight reddish tints, of a dull aspect.

var. C. Also larger, diam. 4 in., presenting a tint of reddish in the centre, margin a little folded. Gills white, numerous, "almost" pass for free. Stem straight,  $1\frac{1}{2}$  in. long.—*Secr.* 535.

**1215. *Russula (Heterophyllæ) consobrina.*** *Fr. Hym. Eur.* 447. *Fr. Mon.* 195. *Sacc. Syll.* 1832. *Stevenson* II., 123. *Cooke Hdbk.* II., 1215. *Cooke Illus. t.* 1055.

Very acrid, pileus fleshy, rather fragile, expanded or depressed, flesh white, under the thick (moist), viscid pellicle cinereous, margin membranaceous, straight, even; stem spongy, stuffed, firm, white, becoming cinereous; gills adfixed, crowded, white, many dimidiate and furcate.

In larch woods.

Commonly broad, not fœtid, disposed towards the former, gills towards the latter approximating. Pileus at first campanulate, gills free, then as expanded, adnate, scarcely connected by veins, but this note is deceitful. Colour umber, olivaceous, fuscous, or grey, *Secr.* 519, 527-529, but a suspicion of admixture of *Russula rigides*.—*Fr. Hym. Eur.* 447.

Stevenson says, "Stature in general that of *R. emetica*, but differing in the colour of the pileus, and in the very unequal gills."

Amongst moss, in larch woods. Stem solid but soft, 2-3 in. long, 1 in. thick, equal, even, smooth, white, at length becoming cinereous. Pileus fleshy, fragile, campanulate, then expanded, at length depressed, 3 in. broad, dark cinereous or fuscous olive; margin patent, even, membranaceous. Flesh white, under the thick, viscid, separable cuticle cinereous. Gills at first free, then with the expansion of the pileus, apparently adnate, broad, crowded, white, many dimidiate and furcate. Taste very acrid. Stature of *R. emetica*, but differing in colour and in very unequal gills.—*Fr. Mon.* 195.

The following are somewhat doubtful descriptions given by Secretan :—

***R. viridigrisea.*** *Secr. No.* 519.

Pileus greenish grey, shining, viscid, the colour nearly uniform. It is plano-concave, centre depressed, margin folded in and at length straight, rather tuberculose and striate. Diam. 4 in. Often set obliquely on the stem. Flesh 6 lines thick.

Gills white, numerous, narrow, straight or convex, adnate, 4 lines wide, not at all veined at the base. Some short gills.

Stem white, shining, 3 in. long, 10 lines thick, thickened at the summit, attenuated at the base, and forming in the middle an angular thickening very remarkable, underneath which it comes again to narrow and bends itself. It is nearly solid and afterwards hollow. Odour feeble and a little agreeable. This plant, fleshy, heavy, is solitary.—*Secr.* 519.



**R. luridus russula.** *Secr. No. 527.*

Pileus olive brown at the margin, yellowish olive in the centre, approaching convex, more or less deformed, at length plane, centre depressed. Diam.  $2\frac{3}{4}$ . Flesh white, 4 lines thick.

Gills white, tending to yellow, especially at the margin of the pileus, numerous, crowded, fragile, 3-5 lines wide, straight, adnate, short gills anastomosing with the longer ones.

Stem white, shining, 2 in. long, 10-12 lines thick, swollen at the summit, compressed at the base, widened and rounded at the extremity, whole plant fleshy and firm.—*Secr. 527.*

Under firs.

**R. fumosa russula.** *Secr. No. 528.*

Pileus bistre by zones, margin turning bleached, the centre a little olive, an intermediary zone is darker, surface shining, without striæ. It becomes plane, centre depressed, set obliquely on the stem. Diam.  $2\frac{3}{4}$  in. Flesh white, 4 lines thick.

Gills white, numerous, straight, 1 line wide, veined at the base, adnate. Here and there a short one.

Stem white, mealy, especially by the gills,  $1\frac{3}{4}$  in. long,  $6\frac{1}{2}$  lines thick, swollen at the summit, slightly ventricose, curved, and terminating in a point. Flesh white, attacked by insects. Odour not disagreeable. Solitary.—*Secr. 528.*

Under oaks.

**R. consobrina.** *Secr. No. 529. Paul. t. 75, f. 1-5. Batsch. f. 6-7.*

Pileus slate grey, dull, darker in the centre when large, bleached at the margin. In youth the margin is more white and the centre punctate with black. It is convex, with the centre depressed, at length concave, margin splitting like a star, sometimes set obliquely on the stem, margin not striate. Diam.  $2\frac{1}{2}$  in. Flesh white, 4 lines thick.

Gills white, becoming a little yellowish in desiccation, numerous, slender, 3 lines wide, their form following the contour of the pileus. A small number furcate, arriving at the stem they are very much veined and as if branched, they are stopped at the same level, and seem attached by a point.

Stem white, reddish at the foot,  $1\frac{1}{2}$  in. long, 9 lines thick, straight, swollen at the two extremities, rounded at the base. Flesh destroyed, becomes hollow.

Under firs.

var. B. The centre darker, is encircled by a zone of light orange and mixed; this rather large zone is especially terminated by a darker hue, which is not very distinct; the rest is slate grey, mixed and whitened. Surface dry, a little shining. Finally, the centre takes a very light reddish yellow, encircled by confused zones of dark flesh colour, more remote dark brown and light grey at the margin. The pileus is plane, deformed, depressed at the centre.

Diam. 3 in. Stem white,  $1\frac{1}{4}$  in. long, 10 lines thick, inflated at apex, compressed, curved, and attenuated at the foot. Firm and dry.—*Secr.* 529.

var. **sororia**. *Fr. Hym. Eur.* 447. *Stevenson* II., 124. *Cooke Hdbk.* II., 1215. *Cooke Illus.* t. 1057. *Fries Icon.* t. 173, f. 1. *Larbr.* t. 19, f. 7.

Pileus convex, then plane or depressed, margin striate, gills rather distant, connected by veins.

In pine woods.

Habit and colour the same, but differing in many points. Stem white, gills with many dimidiate but few furcate.—*Fr. Hym. Eur.* 447.

var. **intermedia**. *Cooke Illus.* t. 1056. *Cooke Hdbk.* II., No. 1215.

Pileus fleshy, depressed, viscid, margin thin, striate; stem usually attenuated downwards, becoming cinereous and striate; gills dirty white.

On the ground under trees.

This resembles *sororia* in the striate margin, differs in the cinereous, striate stem. From *consobrina* it differs in the striate margin, but resembles it in the cinereous stem.—*M. C. C.*

SPORES subglobose, 10  $\mu$  diam.

**1216. Russula (Heterophyllæ) fœtens.** *Pers. Syn.* p. 443. *Fries Mon.* 195. *Fr. Hym. Eur.* 447. *Fr. Sver. Svam.* t. 40. *Sacc. Syll.* 1833. *Krombh.* t. 70, f. 1-6. *Bull. Champ.* t. 292. *Venturi* t. 33, f. 1-3. *Viviani* t. 41. *Sow.* t. 415. *Stevenson* II., 14. *Cooke Hdbk.* II., 1216. *Cooke Illus.* t. 1046.

Acrid, fœtid, pileus bullate, then expanded and depressed, rigid, adnate pellicle viscid, disc fleshy, margin broad, membranaceous, at first turned in, tuberculose-sulcate, stem stout, stuffed, then hollow, gills adnexed, unequal, and furcate, veined and anastomosing, whitish, at the first weeping.

In woods. Common.

Large, very rigid, with a very deep empyreumatic odour, soon distinct, pileus at length reflexed and repand. Gills (at first free) thin, obsoletely yellowish, dirty when bruised.—*Fr. Hym. Eur.* 447.

In woods, etc., everywhere common. Large, in a manner rigid, with a heavy empyreumatic odour. Taste acrid. Stem stout, stuffed, then hollow, 2 in. and more long,  $\frac{1}{2}$ -1 in. thick, whitish. Pileus slightly fleshy, at first bullate, then expanded and depressed, pellicle adnate, not separable, in moist weather viscid, 4-5 in. and more broad, dingy yellow, sometimes growing pale, margin broadly membranaceous, and long sulcate, the ribs at length tuberculose, at first infracted. Flesh thin, rigid-fragile, pallid; gills adnexed, crowded, connected by veins, mixed with many dimidiate and furcate, whitish, at first weeping watery drops, by which it differs from all the preceding. In dry weather the odour sometimes obsolete.—*Fr. Mon.* 196.

SPORES.—8  $\mu$  (W. G. S.); 9-12  $\times$  7-9  $\mu$  (Britz.); 8  $\mu$  (Bizz.); 8  $\mu$  diam., or 9-10  $\times$  7-8  $\mu$  (Sacc.).

For this common species Fries cites Secretan, No. 530.

**R. foetens.** *Secr. No. 530. Bull. t. 292.*

Pileus in early infancy yellowish white, then passes to dark yellowish grey, or yellow ochre leading to orange; brown in the centre, and a lighter tint at the margin, coloured brownish. In old age the margin is like golden. It is viscid; in infancy it is globose, the margin bumped and firm, in a sinuous contour; afterwards it becomes plane, humped, and a little raised in the centre. Finally it is concave, margin turned in, and channelled, whose back is tuberculose. Diam. 6 in. Flesh white, 5 lines thick.

Gills yellowish white, not very numerous, slender, entire, fragile, veined at the base, much anastomosed, especially by the stem; they are straight, and finally convex, joined one to the other by a point which adheres to the stem. This junction is produced by a bifurcation which terminates each gill, the bifurcation in form of two threads, which amalgamate one neighbour to part of the other. The front of the gills is prolonged in fine striæ on the stem. Width of gills 4-5 lines. When touched they are spotted with brown.

Stem white, dull, of yellowish tints,  $3\frac{1}{2}$  in. long,  $1\frac{3}{4}$  in. thick, straight, narrowed at the summit, a little thickened in the middle, and terminated in a point. Flesh often devoured by slugs, then appears hollow. In old age it is covered with long greyish fibrils. The odour is certainly foetid.—*Secr. 530.*

var. B. Pileus approaches dull white, then turning to a yellowish red, shining. It is some time concave, the margin straightened, unequally striate and tuberculose in old age. Diam. 2 in. Flesh white, 2 lines thick.

Gills white, turning at length yellowish, straight, arrested at the same level, 2 lines wide, fragile, short gills rarely.

Stem a little reddish, charged with white lines, 2 in. long, 4 lines thick, deformed, swollen at the base. The interior is destroyed by insects. All the plant is very fragile. Odour foetid.—*Secr. 530.*

**Agaricus foetens.** *Pers. Eng. Fl. v., 22.*

Gregarious. Pileus 4-5 in. broad, at first convex, the margin broadly folded inwards, convex, at length more or less depressed, with the margin somewhat vaulted, fleshy in the centre, the margin thin, furrowed, and tubercled, the striæ appearing as if a glutinous membrane were stretched over them, dirty yellow, rather brittle. Gills forked, dirty white, or yellowish, moderately broad, connected by veins. Stem 3-4 in. high, above 1 in. thick, obtuse, incrassated at the base, ruggedly hollow within, as if eaten by snails, white or with a dirty yellow tinge, depresso-tomentose; beneath the gills minutely pitted longitudinally, flesh rather yellow. Highly acid, odour very strong and penetrating, empyreumatic, somewhat resembling that of prussic acid, but exceedingly disagreeable.—*Berkeley.*

This is a very common species, and not easily to be confounded with anything else. We have met with specimens without any peculiar odour, and also occasionally others which were decidedly fragrant, with a suggestion of melilot. As we have submitted the latter to the judgment of others who have been with us at the time, and they coincided with us, there can be no suspicion of error as to the odour.—*M. C. C.*

**1217. *Russula subfœtens.*** *Smith Journ. Bot.* 1873, 337. *Cooke Hdbk.* II., 329. *Cooke Illus. t.* 1047. *Sacc. Syll. No.* 1834. *Stevenson II.*, 124.

Pileus bullate, rather viscid, disc fleshy, margin submembranaceous. Stem not stout as in *R. fœtens*, and smaller. Gills thick, distant, and branched. Odour unpleasant, taste rather acrid.

On the ground.

Stevenson says :—"Pileus bullate, somewhat viscid, disc fleshy, margin somewhat membranaceous. Stem not stout ; gills thick, somewhat branched."—*Stevenson II.*, 124.

Stevenson says also :—"This is the plant referred to by Fries, *Syst. Myc.* I., p. 58, as a var. of *R. fragilis*," but this is doubtful, and much more probably *R. citrina* of Gillet.

Stevenson gives the derivation of the name as "*sub* and *fœtens*—somewhat stinking," but this was not the meaning attached by W. G. Smith, who intended it as "approaching *R. fœtens*."

Saccardo calls the gills "*tenuibus*" in error, whereas Smith describes them as *thick*. The whole plant is tough and elastic, and the gills are weeping in moist weather, and when young. Certainly *Russula simillima* (Peck) must strongly resemble it. In all the specimens that we have met with the odour has been very faint and sometimes none at all.—*M. C. C.*

**1218. *Russula (Heterophyllæ) fellea.*** *Fr. Hym. Eur.* 447. *Fr. Mon.* 196. *Fr. Icon. t.* 173, *f.* 2. *Sacc. Syll.* 1837. *Stevenson II.*, 125. *Paul t.* 76, *f.* 4. *Cooke Hdbk.* II., 1218. *Cooke Illus. t.* 1058.

Very acrid, pileus fleshy, thin, convexo-plane, polished, opaque, not growing pale, margin even, at length striate, *flesh firm*, stem spongy, stuffed, then hollow, even ; *gills* adnate, crowded, subequal or bifid behind, all whitish, then *straw-coloured*.

In beech woods.

Is very distinct from all other species in being wholly straw-colour, but the pileus is often darker, passing into gilvous ; pellicle not separable. Gills narrow, weeping in wet weather.—*Fr. Hym. Eur.* 447.

In beech woods this species is common.

A small species, noble, very acrid, with no others easily confounded. Odour none. Stem spongy-stuffed, hollow, fragile, 2 in. long,  $\frac{1}{2}$  in. thick, equal, even, white, then straw-colour. Pileus thinly fleshy, convex, then plane, 1-2 in. broad, polished



smooth, gilvous straw-colour, disc darker; margin even, when exolete faintly striate. Pellicle of the pileus closely adnate, thin; flesh of the colour of the gills. Gills adnate, crowded, thin, narrow, obsoletely connected by veins, mixed with a few dimidiate or furcate behind, straw colour. Also in this the gills in moist weather weep drops of water.—*Fr. Mon.* 196.

Fries quotes Secretan No. 501 under this species.

**R. fellea.** *Secr. No.* 501.

Pileus straw yellow, of an uniform tint, the margin browning in extreme old age. It is a long time plane, sometimes a little umbonate, ordinarily rather regular, orbicular, the margin straight, thin, without striæ except in extreme old age. Diam.  $2\frac{1}{4}$  in.; it becomes concave. Flesh yellowish, 3 lines thick, firm.

Gills white, then yellowish, numerous, straight or convex, adnate, slender, fragile, some furcate near the stem,  $1\frac{1}{2}$  lines wide, very few or no short gills.

Stem yellowish white, dull,  $1\frac{3}{4}$  in. long, 6 lines thick. Straight, a little augmented above, and narrowed towards the base, which ends in a point. Flesh yellowish, firm. Odour a little agreeable. Taste acrid, burning.—*Secr.* 501.

In mixed woods.

**1219. Russula (Heterophyllæ) elegans.** *Bres. F. Trid.*, p. 21, t. xxv. *Sacc. Syll.* 1838. *Cooke Hdbk.* II., 1219. *Cooke Illus.* t. 1027.

Pileus fleshy, thin, convex, then rather depressed, margin when adult tuberculose striate, viscid, bright rosy flesh colour, soon the circumference suffused with ochraceous, wholly densely granulate, 3-5 c.m. diam. Gills attenuate behind, adnexed, or slightly rounded, very much crowded, equal, rarely somewhat furcate, whitish, when mature entirely or here and there bright ochraceous; orange stem, spongy, then stuffed and lacunose, hollow, somewhat thickened at the base, white, ochraceous below, rather rugulose, 3-5 c.m. long, 1 c.m. thick; flesh white, when old ochraceous, acrid. Spores sphaeroid, beautifully echinulate, uniguttulate, whitish in heaps, greenish hyaline under microscope, 8-10  $\mu$ , basidia clavate, 20-25  $\times$  8-10.—*Bresadola.*

In moist woods.

SPORES 8-10  $\mu$  diam. (*Sacc.*), 10  $\mu$  (*G. M.*).

**1220. Russula (Heterophyllæ) Queletii.** *Fr. Hym. Eur.* 448. *Sacc. Syll.* 1839. *Stevenson* II., 125. *Cooke Hdbk.* 1220. *Cooke Illus.* t. 1028. *Quelet Jura* t. 24, f. 6.

Acrid, pileus compact, campanulate, convex, then plane, even, viscid, dark violet or fuscous, margin slightly striate, purplish lilac; stem spongy, farinose, purple violet; gills attenuated, unequal, or furcate, weeping, white.

In pine woods. Spring.

Flesh firm, white, purple red under the cuticle. The drops on the gills when dry leave bluish grey or pale olive spots.

“ Easily distinguished from *R. integra* by the white gills.”—*Stevenson*.

It is sometimes suggested that the three species called respectively *R. Queletii* (Fries), *R. expallens* (Gillet), and *R. drimeia* (Cooke) are but forms of one species, but with this we are not disposed to agree. There is a superficial resemblance in form, size, and colour, but there the resemblance ends. *R. Queletii* has white weeping gills, but those of *R. expallens* are pale yellowish, and those of *R. drimeia* sulphur-coloured from the first, besides other differences which become evident on comparison. Of the three *Russula Queletii* and *R. expallens* are most nearly allied, but the other does not belong to the same section.—*M. C. C.*

**1221. *Russula (Heterophyllæ) expallens.*** *Gill. Tab. Champ. p. 49. Sacc. Syll. No. 1840. Cooke Hdbk. II., 1221. Cooke Illus. t. 1029.*

Pileus fleshy, firm, somewhat depressed, viscid, bright purple, centre dark purple (6-8 c.m. diam.), at length, except the disc, discoloured, cuticle separable, flesh purple, stem cylindrical, firm, equal, or a little incrassated about the base, 5-8 c.m. long, 2 c.m. thick, becoming purplish, mealy; gills pallid yellow, furcate at the base, broad.

Under trees.

OBS. Gillet thinks that *R. drimeia* (Cke.) is the same species, which can hardly be the case, as that does not become discoloured, the flesh is not purple, and the gills are lemon-coloured from the first. Perhaps *Russula fragilis*, Krombh., t. 64, fig. 14-18, may be this present species.—*M. C. C.*

## NEGLECTED DIAGNOSES.

By M. C. COOKE.

***Camarops quercicola*, B. & Cooke.** = *Eutypa quercicola*, *Berk. in Herb. No. 8808.*

Stromate cortice innato substantia formato. Peritheciis gregariis, subglobosis, immersis, prominulis, pertusis. Ascis clavatis, longe stipitatis, octosporis. Sporidiis lanceolatis, uniseptatis, medio constrictis, fuscis,  $20 \times 4 \mu$ .

On bark of *Quercus*. N. Carolina. (741.)

***Sphæria cavernosa*, Mont. in Herb.**

On *Viburnum*.

Sporidia same as in *Aglaospora profusa*.

***Valsaria spurca*, B. & C.** = *Sphæria spurca*, *Berk. & Curt. in Herb. Berk.*

Pustulate, covered by the epidermis, which is at length pierced. Asci clavate, sporidia elliptical, uniseptate, brown, slightly constricted, with a thick, hyaline epispore,  $25-30 \times 8-10 \mu$ .

On bark. United States. (*Murray*.)

**Valsa (Chorostate) biconica**, Currey Linn. Trans. xxii., fig. 142.

Sporidia uniseptate, greenish, biconical,  $28-30 \times 8 \mu$ .

**Sphæria Phœnicis**, DR. & Mont.

Apparently the same as *Anthostomella contaminans*, DR. & M. Sacc. Syll. 1035.

On palms. Algeria.

**Melanopsamma buxiformis**, B. & C. = *Sphæria* (Pertusæ) *buxiformis*, B. & Curt.

Perithecia scattered, erumpent, rather small, innate at the base, depressed above, smooth, black. Asci clavate. Sporidia biserial, elongated-elliptical, uniseptate, not constricted, hyaline,  $22-26 \times 8 \mu$ .

On naked wood. Cuba. (888.)

*Sphæria biordinata*, Berk., on wood, Cuba, 886, hardly appears to be distinct.

**Physalospora asbolæ**, B. & Br. = *Sphæria asbolæ*, B. & Br. in Herb.

Gregarious. Perithecia innate, covered, small, globose, black, pierced. Asci clavate. Sporidia elliptical, continuous, hyaline,  $18-20 \times 10 \mu$ , granular within.

On palms. Ceylon. (307.)

**Endoxyla lineata**, Fr. = *Sphæria lineata*, Fr. S. M. II., 373.

Sporidia allantoid,  $8-10 \mu$  long.

Specimen from Schweinitz.

**Didymella psoriella**, B. & C. = *Sphæria psoriella*, B. & C. in Herb.

Gregarious or scattered, perithecia innate, elevating the cuticle, globose, black, pierced; asci clavate, octosporous; sporidia elliptical, then a little compressed towards each end, and shortly lanceolate, uniseptate, constricted, each cell binucleate, hyaline,  $25 \times 8 \mu$ .

On *Platanus*. Carolina. (2130.)

**Didymella uberiformis**, Schw. = *Sphæria uberiformis*, Schw. Amer. Bor. 1665, nec. Fries.

Erumpens, corticola, sparsa. Peritheciis semi-immersis, prominulis, atris, ostiolo crasso, conico. Ascis clavatis, sporidiis lanceolatis, uniseptatis,  $18 \mu$  long.

On bark of *Betula*. Bethlehem.

**Didymella rubitingens**, Blox. = *Sphæria rubitingens*, Bloxam in Herb. Berk.

Perithecia erumpent, soon naked above and conical, immersed at the flattened base, staining the matrix purplish red, smooth, shining, black. Asci clavate, sporidia lanceolate, uniseptate, a little constricted, each cell biguttulate,  $20 \times 7 \mu$ , hyaline.

On herb stems. Gopsall. (Bloxam.)

**Didymosphæria tecomatis**, Berk. & Curt. = *Sphæria tecomatis*, B. & C. in Herb.

Caulicola, sparsa, tecta. Peritheciis innatis, minutis, subglobois, papillatis, atris; ascis clavatis, octosporis; sporidiis elliptico-fusiformibus, biserialibus, uniseptatis, fuscis,  $10-12 \times 4 \mu$ .

On *Tecoma radicans*. Carolina. (4947.)

*Sphæria micheneri*, B. & C. in *Herb.*, from Pennsylvania (6038), apparently the same thing, with the sporidia immature.

**Metasphæria rubida**, *Blox.* = *Sphæria rubida*, *Bloxam in Herb. Berk.*

Caulicolous. Perithecia rather small, globose, black, with a papillate ostiolum, at first covered by the cuticle, but at length exposed. The matrix stained with a purple-red colour, which is partially discharged with moisture. Asci clavate. Sporidia fusiform, straight or curved, 3-5 septate, constricted, hyaline,  $25 \times 3 \mu$ .

On herb stems. Twycross. (*Bloxam.*)

**Thyridaria crocosarca**, B. & Br. = *Melogramma crocosarca*, B. & Br. in *Herb.*

Erumpent. Perithecia saffron colour, mealy, cæspitose, 2-6 together, often confluent, on a narrow stroma, pierced at the apex, forming clusters 2 m.m. long. Asci clavate, octosporous. Sporidia fusiform, 7-11 septate, pale, not constricted,  $40 \times 12 \mu$ , with linear paraphyses.

On bark. Ceylon. (*Thwaites* 131.)

**Sphæria rhodoglea**, B. & Curt. in *Herb.*

This is partly a *Phoma* and partly a *Rhabdospora*, with filiform sporules, 30-35  $\mu$  long.

On *Negundo*. Carolina. (6353.)

**Sphæria berchemiæ**, Berk. & Rav. in *Herb.*

No asci seen, only brown stylospores, 3-5 septate,  $20-25 \times 5 \mu$ , probably a *Hendersonia*.

On *Berchemia volubilis*. S. Carolina. (613.)

**Sphæria radiella**, B. & C. in *Herb.*

On *Morus multicaulis*. U.S.A. (4808.)

This is merely *Nectria Russellii*, B. & C., with the sporidia just commencing to be formed.—Sacc. Syll. 4668.

**Pyrenophora lanuginosa**, Sacc. Syll. 3867.

To this species is probably to be referred *Sphæria Ravenelii*, B. & C. (*Sphæria comata*, Tode).

On dead culms of grasses, from Santee Canal, S. Carolina. (1413.)

**Dimerosporium aterrimum**, Cke. & Wint.

Epiphyllum. Maculis orbicularibus gregariis, aterrimis, velutinis (5 m.m. diam.), filis flexuosis, plerumque simplicibus, opacis. Peritheciis subglobosis vel irregularibus, astomis, ascis ovoideis; sporidiis arcte ellipsoideis, immaturis.

On coriaceous leaves. Manipur, India. (*Watt* 7463.)

**Asterina Darwini**, Berk. Fl. Antarc. 454.

Seems to be the same as *Asterina Azaræ*, Lev. Sporidia uniseptate,  $15 \times 4 \mu$ .

On *Azara lanceolata*. Cape Tres Montes. (*Darwin.*)

The following specimens we have either been unable to examine, or, having done so, have discovered no fruit.

**Valsa asimilis**, Ces. Born.

On bark. Pulo Penang.

**Sphæria Bertiana**, De Not.

On bark. Allied to *S. umbrina*.



**Sphæria Bromeliæ**, Schwz.

On *Bromelia* leaf. Surinam.

**Sphæria complexa**, Mont.=*Diatrype* or *Valsa* ?

On bark. France.

**Sphæria constipata**, Mont.

On *Smilax aspera*. Aix.

**Sphæria (confluentes) Cratægi**, Schw. Amer. Bor. 1445.=*Valsa*.

Perithecia 5-6 in a circle, necks convergent in the centre.

On *Cratægus*. Bethlehem.

**Sphæria Curtisii**, Berk. MS.

On nuts of *Carya*. Carolina.

**Sphæria dipsaci**, Cast.

On *Dipsacus*. France.

**Sphæria disseminata**, Schwz. Am. Bor. 1730.

On herbs. N. America.

No fruit, probably a *Phoma*.

**Sphæria epitephra**, B. & Curt.

On *Platanus*. Carolina.

**Sphæria faginea**, Pers. Fr. Scler. Suec. 262.

On bark of *Fagus*.

Sporidia elliptical, brown.

**Sphæria flavitecta**, Berk.

On *Pteris*. Meudon.

**Sphæria inconspicua**, Currey.

=*Diaporthe*.

**Sphæria juglandis**, Bloxam.

Valsoid. Sporidia biseriate, narrow, elliptical, resembling *Phoma* spores.

On walnut bark. Britain.

**Sphæria Kurzii**, Berk.

On *Metroxylon*. Java.

**Sphæria lonicervæ**, Cast., nec. Fries.

On *Lonicera*. France.

**Sphæria menispermi**, Pers.

On *Menispermum Canadensis*. Paris.

**Sphæria micrographa**, Fries in litt.

Ex herb Montagne.

**Sphæria microstigma**, Mont.

On *Hemerocallis lutea*. France.

**Sphæria monogramma**, Mont.

On *Equisetum*. Ex Castagne.

**Sphæria nigrificans**, N.

On leaves.

**Sphæria olivacea**, Currey.

On bark. Britain.

**Sphæria oxystoma**, Pers.

On twigs. Sedan. (Herb Montagne.)

- Sphæria patella** (*Fries*), *Schw. Am. Bor.*  
On *Pastinaca*. Only a *Phoma*.
- Sphæria penicillus**, *Pers.*  
On oak branches.
- Sphæria phlyctis**, *DR. & M.* (*Entypella*).  
On vine twigs. Algeria.
- Sphæria plinthis** (*Fries*), *Schw. Amer. Bor.* 1725.  
On herbs.
- Sphæria porri**, *Schw. Amer. Bor.* 1460.  
On *Allium*. Bethlehem.
- Sphæria rubi**, *Cast.*  
On *Rubus* stems. Aix.
- Sphæria tomentosa**, *Currey*.  
On bark. Britain.
- Sphæria xanthoderma**, *Link.*  
On trunks. Brazil.
- Sphæria barbatula**, *B. & Curt.* = *Hypoxylon investiens*, *Schwz.*

### SPHÆRIACEÆ IMPERFECTÆ COGNITÆ.

In order to aid in practically reducing this "appendix" in Saccardo's *Sylloge* still further than has already been done, we have examined specimens from the Herbarium of Schweinitz chiefly in the Berkeley Herbarium, with the following results:—

- 4227. Nectria atrofusca** (*Schw.*). *Sphæria atrofusca*, *Schw. Amer. Bor.* 1429.  
Asci clavate, stipitate, sporidia elliptical, uniseptate, hyaline,  $10-12 \times 4 \mu$ .
- 4321. Diplodia semitecta** (*Fries*). *Sphæria semitecta*, *Fries.* (*Sphæria panacis*), *Fries Scler. Suec.* 319.  
Sporules elliptical, uniseptate, scarce constricted, dark brown,  $22-25 \times 8 \mu$ .
- 4326. Phoma pericarpium** (*Schw.*). *Sphæria pericarpium*, *Schw. Amer. Bor.* 1590.  
Sporules minute, hyaline.
- 4328. Phoma glandicola** (*Schw.*). *Sphæria glandicola*, *Schw. Amer. Bor.*  
Sporules  $5 \times 3 \mu$ , basidia  $20 \times 3 \mu$ .
- 4332. Phoma surculi** (*Fr.*). *Sphæria surculi*, *Schw. Amer. Bor.* 1583.
- 4348. Sphæria oblectæ**, *Schw.*  
This appears to be ascigerous, but the asci are immature.
- 4351. Sphæria rhoina**, *Schw.*  
This is not a *Sphæria*, there are no asci. The sporules are elliptical, continuous, with a large central guttule,  $20 \times 8 \mu$ .

- 4361. *Diplodia conspersa* (Schw.).** *Sphæria conspersa*, Schw. Amer. Bor. 1663.

Sporules narrowly elliptical, uniseptate, brown,  $14 \times 6 \mu$ .

- 4372. *Sphæroopsis ampelos* (Schw.).** *Sphæria ampelos*, Schw. Amer. Bor., 1637.

Sporules elliptical, continuous, brown,  $10-12 \times 6 \mu$ .

- 4374. *Phoma pyrina* (Fries).** *Sphæria pyrina*, Fr. S. M. II., 494.

Sporules hyaline,  $6 \times 3 \mu$ .

- 4375. *Phoma erumpens* (Schw.).** *Sphæria erumpens*, Schw. Syn. Car. 209.

Sporules minute, linear, oblong,  $4-5 \times 2 \mu$ .

- 4387. *Physalospora obtusa* (Schw.).** *Sphæria obtusa*, Schw. Amer. Bor. 1688.

Asci clavate, sporidia lanceolate, hyaline,  $35-40 \times 9 \mu$ .

- 4383. *Physalospora padina*, Fries.** sub-*Sphæria*.

Sporidia elongated-elliptical, biseriate, hyaline, continuous, then quadriguttulate,  $20 \times 8 \mu$ .

Specimen from Mougeot.

- 4384. *Diplodia ruborum* (Schw.).** *Sphæria ruborum*, Schw. Amer. Bor. 1677.

Sporules uniseptate, constricted, brown,  $20 \times 8 \mu$ , possibly not distinct from *D. rubi*.

- 4385. *Sphæroopsis pomorum* (Schw.).** *Sphæria pomorum*, Schw. Amer. Bor. 1683.

Sporules  $24 \mu$  long.

Probably the same as *Sphæroopsis malorum*, Peck., Sacc. Syll. No. 1647, of which *Phoma malorum*, Berk., Sacc. Syll. 908, is possibly an earlier condition.

- 4390. *Sphæroopsis druparum* (Schw.).** *Sphæria druparum*, Schw. Amer. Bor. 1682.

Sporules continuous,  $25 \mu$  long.

It is doubtful whether distinct from *Sphæroopsis pericarpii*, Peck., Sacc. Syll. 1680, or *S. Caryæ*, C. & E., Sacc. Syll. 1681.

- 4391. *Phoma capsularum* (Schw.).** *Sphæria capsularum*, Schw. Amer. Bor. 1681.

Sporules straight or curved, binucleate,  $8 \mu$  long.

- 4393. *Teichosporella azaleæ* (Schw.).** *Sphæria azaleæ*, Schw. Amer. Bor. 1685.

Asci clavate, sporidia fusoid-elliptical, obtuse, murali-cellular, hyaline,  $25 \times 10-12 \mu$ .

- 4403. *Rhabdospora jasmini* (Schw.).** *Sphæria jasmini*, Schw. Amer. Bor. 1704.

Sporules filiform, curved or straight,  $22 \mu$  long.

- 4415. *Phlyctaena tecta* (Schw.).** *Sphæria tecta*, Schw. Amer. Bor. 1731.

Sporule filiform, hamate at the tips,  $25-30 \mu$  long.

- 4423. *Metasphæria obtusata* (Schw.).** *Sphæria obtusata*, Schw. Amer. Bor. 1737.

Asci clavate, stipitate; sporidia lanceolate, 5-7 septate,  $50 \times 7 \mu$  hyaline.

- 4426. *Macrophoma meloplaca* (Schw.).** *Sphæria meloplaca*, Schw. Amer. Bor. 1753.

Sporules elliptical, hyaline,  $20 \times 10 \mu$ .

- 4433. *Phomatispora echinophila* (Schw.).** *Sphæria echinophila*, Schw. Amer. Bor. 1755.

Asci cylindrical, sporidia uniseriate, narrowly elliptical, hyaline,  $6 \times 2 \mu$ .

## BACTERIA IN PLANT DISEASE.

For some time it has been suspected that microbes have something to do with certain obscure diseases of plants. These suspicions seem to be developing themselves almost into certainties, and to present another curious analogy between the diseases of animals and plants. The disease known in the United States as "Peach yellows" has constantly evaded all search for mycelium, or trace of fungoid development, and yet it is a destructive and insidious foe. Professor Burrill made investigations in 1888 and 1889, but without any decided results. Nevertheless he reports that "he had found in the tissues of the root and of the old and young stems of diseased trees an organism classed with the bacteria, which is not known to occur elsewhere. This organism has been frequently obtained by methods of culture under circumstances which preclude the possibility of its coming from anything except the inner cells of the tree. He had it growing in artificial media, and it exhibited all the peculiarities of a pathogenic rather than a saprophytic microbe. It had peculiarities which served to distinguish it from all others of its kind, and he was convinced it had never before been described by anyone. He found it in every set of specimens examined known to be affected with this disease, and had thoroughly tried in the same manner to find it in healthy stock and failed." Still further he says, "If the disease is really due to the microbe mentioned the malady differs widely from that of any heretofore described bacterial injury to living vegetation. The microbe must be sparsely, but widely, distributed through the still living tissues of the tree, in which it must very slowly develop without causing evident local disturbance. This latter especially is entirely at variance with known effects of parasitic organisms. But we know that the peach tree affected with this disease very gradually succumbs, lingering along several years without local injury of pronounced type."\*

On the subject of the California vine disease, Mr. Pierce, a special agent sent to investigate the disease, states that yellow

\* Report of the Secretary of Agriculture, U.S., Section of Vegetable Pathology for 1889, p. 423.



spots occur on the leaves, which showed no trace of insects or fungi. That "the peculiar appearance and location of these spots led to a careful study of the same, which resulted in finding bacteria-like bodies in large numbers within the chlorophyllose cells of the spongy parenchyma immediately surrounding the spiral vessels supplying that region. After a long series of observations made on material from various portions of the diseased districts, which in no case failed to disclose the diseased vines as swarming with these bodies in all portions where sap had a ready flow, he believed it proper to undertake a series of experiments to determine if these bodies always present bore any relation to the disease as a whole. He had little doubt that they were micro-organisms, and gave to the local spotting of the leaves their characteristically sharp outline. Cultures from various parts of the vine were made in agar-agar and other media. Three sorts of bacteria were found with enough constancy to warrant further study, but he had not so far been able to determine whether any of these were the cause of the disease. In view of the fact that several Italian students have for years claimed that an Italian disease of similar characteristics is caused by bacteria, it is proper the matter should be decided if possible."\*

It is established then, beyond doubt, that bacteria inhabit the tissues of plants in great numbers, that they appear to be of kinds peculiar to those plants, and may, or may not, be the cause of some of the plant diseases. To carry on the subject still further we must refer to a series of investigations on a disease of melons, and, by the results of these investigations, exhibit a very strong presumption that microbes are the cause of some diseases of plants.

"The attacked vines varied somewhat in their appearance, but generally there is a decay of the stem in proximity to the root, and then the whole plant wilts and fails to grow. Sometimes one or more leaves will fall to the ground, and rot away, before the balance of the plant is seemingly affected."

Dr. Byron Halsted reports† that "a microscopical examination of the decaying stems, leaves, and fruit showed that the decomposing tissues were teeming with bacteria. Inoculations of healthy fruits were made in the usual way, taking the germs from the centre of freshly-decaying cucumbers. It was found that with no other fungus present these germs were abundantly able to introduce a rapid decay into cucumbers, melons, and squashes. Cucumbers seem to be the favourite, and in them the decay is the most rapid. It will run from one end to the other, through the succulent centre of a four-inch fruit, in a single day.

"The next step in the study was the application of these germs to healthy plants in the field. When the inoculation was made near the end of a vine the latter rotted away in from three to four days, and when nearer the base a longer time was required, but in

\* Report for 1889, p. 427.

† "Botanical Gazette," Nov., 1891.

all cases an ulcer was formed which spread more or less rapidly, depending upon the tissue infected. In old stems the decay was almost entirely internal, and did not show much until the disease had spread through the pith to some distant soft parts. A medicine dropper was employed to place a charge in the middle of several petioles of large squash leaves. Upon the next visit, twenty-four hours after, all such leaves had fallen to the ground, and the portion of the petioles below the point of inoculation, six or more inches in some cases, were thoroughly decayed. In short, the bacterial disease first found in the cucumber, and afterwards propagated from fruit to fruit in the laboratory, as also upon cut stems and petioles, is readily transmitted to vigorous living vines of the cucumber and squash in the field." Sixteen seeds of squash were divided, and eight planted in a pot covered with a bell glass, watered with pure water, whilst eight in another pot were watered from the first with the juice of a cucumber which had decayed with bacteria. The first eight seeds germinated quickly, producing large, deep green plants; while in the other pot only two plants appeared above ground, and they were of a dwarfed, sickly yellow colour, and did not continue to grow. The remaining six seeds, when removed from the soil, were decayed and noisome.

In another experiment eight seeds were placed on blotting paper, moistened with distilled water, and covered. A duplicate set were similarly watered with a solution containing bacteria from a decaying cucumber. The first series all germinated with their usual vigour, while those which came in contact with the bacterial germs failed to germinate, and soon decayed.

"The pure virus was next introduced into the growing stems and green fruits of the tomato, and in both cases quickly produced a decay that caused the stems to fall and the fruit to become a watery mass enclosed by the skin, similar to the cucumber from which the bacteria were taken for inoculation. At the time of the experiment some boxes of young tomato plants were close at hand, and into the centre of one of these a decaying cucumber was placed. In six hours some of the stems of the tomato plant, six inches in height, had rotted off close to the ground, where the liquid from the decaying fruit had come in contact with the young plants. In ten hours all the plants in the vicinity of the decaying cucumber were destroyed."

This account seems to be rather conclusive, especially when independently and collaterally supported by evidence given by other observers, in respect to other plants, having similar results.

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## NOTES ON EDIBLE FUNGI.

We have just received an interesting communication from a fungus-eating correspondent in the United States, and desire to quote a few extracts, which may be of interest to mycophagists on this side of the Atlantic. He writes that "the present season has been an exceptionally good one for 'toadstools.' I have

increased my list of edible varieties to over three hundred. All of these have been thoroughly tested by myself. I am able to assert, positively, from having eaten full meals of them often, that *Russula emetica* is as good as any *Russula*; that many of the spring varieties of *Russula*, sweet in the spring, are as peppery as the *emetica* when they grow in the autumn."

"Both *Agaricus epixanthus* and *Agaricus fascicularis* are excellent. The *Boletus satanas* is one of the very best of the *Boleti*.

"For some years I have been delving into the mystery of propagation from the spores of the wild species, and have met with but little success. While I feel assured that I have the secret of growing *Cantharellus cibarius* from the spores, I am only certain that I can grow the *Agaricus procerus*. My researches convince me that, as the spores of *Agaricus arvensis* and *Agaricus campestris* are fecundated while in the digestive apparatus of the horse,\* and that the fertilized spores are scattered and buried in our pastures from horse-droppings, by a common black beetle ('tumble bug') the spores of the *Russula* and many other varieties have to pass through the system of insects that prey upon them before they will propagate their kind. I do not think any process will grow any variety of the *Agaricini* or *Boleti* (except *A. procerus*) before the spores have passed through some insect or animal, in which the impregnation of the spores occurs. *Lycoperdon giganteum* comes within this belief.

"My experiments tell me that many varieties of edible and non-edible fungi can be propagated from the mycelium, but the habitat of the species must be religiously observed and maintained."

There are some remarks in the above quotations which we would like to see confirmed before we place implicit faith in them, especially the fertilization of spores in some animal or insect host. As to the growth of *Agarics*, and even of *Lycoperdon*, from mycelium we have been convinced by experience. By the accumulation of facts we shall come near the truth—some day.—*M. C. C.*

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## NEW EXOTIC FUNGI.

By M. C. COOKE.

### **Polystictus (Discipedes) nigrescens, Cooke.**

Pileo submembranaceo, plano, reniformi, lævi, glabro (5-10 c.m. diam.), fuligineo-nigrescente, postice in stipitem brevem disciformi producto, margine acuto, subfissili, poris brevissimis, minutis, rotundatis, æqualibus, fusco-nigricantibus. Contextu pallido.

On trunks. Brazil. (*Glaziou*, 18,767.)

### **Hydnum stereoides, Cooke.**

Pileis membranaceo-coriaceis, numerosis, imbricatis, stipatis,

\* And this has been as strongly denied.

rufo-brunneis, dein castaneis, glabris, lævibus, flabelliformibus vel cuneatis, postice in stipitem lateralem productis (2-3 c.m. alt.), margine pallidior, subtus sterili, tenui, lacerato vel dentato; aculeis subtilis, confertis, brevibus, albido-pallidis.

Ad truncos. Perak. (1660.)

Somewhat resembling *Stereum elegans*.

**Helotiella stromatica**, Cooke.

Hypophylla, stromate atro, orbiculari (5 m.m. diam.) insidens. Cupulis sessilibus ( $\frac{1}{8}$  m.m.), gregariis, plano-convexis, mollis, ceraceis vel ochraceis, extus saccharino-granulatis, pallidioribus. Ascis clavatis, sporidiis fusoides, uniseptatis ( $30 \times 6 \mu$ ), hyalinis, utrinque appendiculatis.

On dead leaves. Brazil. (Glaziou, 18,799.)

**Dothidella Bambusæ**, Cooke.

Epiphylla. Stromatibus oblongis ellipticisve, minutis, convexis, atris ( $\frac{1}{2}$ -1 m.m. long), loculis paucis. Ascis clavatis, sporidiis lanceolatis, medio uniseptatis, intus granulatis, pallidis,  $40-45 \times 10 \mu$ .

On bamboo leaves. Brazil. (Glaziou, 18,794.)

**Glypeolum dissiliens**, Cooke.

Peritheciis sparsis, superficialibus, sæpe gregariis, macula nulla insidentibus, lenticularis, glaberrimis, atris, nitidis ( $\frac{1}{2}$  m.m.), carbonaceis, astomis. Ascis subclavatis, octosporis. Sporidiis fusiformibus, uniseptatis, medio dissilientibus, hyalinis, intus granulatis vel nucleolatis ( $70-80 \times 8 \mu$ ).

On coriaceous leaves. Brazil. (Glaziou, 18,739.)

**Metasphæria pusilla**, Cooke.

Hypophylla, gregaria. Peritheciis minutis, innatis, plagias latas efformantibus, ostiolo papillato. Ascis clavatis, sporidiis fusiformibus, primitis uniseptatis, nucleatis, demum leniter quinqueseptatis, hyalinis,  $40 \times 80 \mu$ .

On coriaceous leaves. Brazil. (Glaziou, 18,798.)

**Helminthosporium Bambusæ**, Cooke.

Cæspitulis compactis, convexis, atris, gregariis, plerumque sphaeriæformibus. Hyphis fasciculatis, erectis, teretis, septatis, pallide fuscis vel subfuliginis. Conidiis acrogenis, lanceolatis, superne acutis, 3-5 septatis, nec constrictis, pallide fuscis,  $60-70 \times 12 \mu$ . Episorio tenui.

On *Bambusa spinosa*. Assam. (Mann.)

**Stereum monochroum**, Cooke & Mass.

Flabelliform, attached by a narrow base, very thin, imbricated; pileus minutely velvety, bright ferruginous-brown, becoming glabrous and darker with age, indistinctly zoned, closely radiato-rugulose; hymenium delicately whitish-pruinose, becoming glabrous, brown with a red tinge; spores elliptical, colourless,  $12 \times 5-6 \mu$ .

On dead wood. Perak.

Pilei 1-2 in. across, rigid when dry. Allied to *S. vespilloneum*, Berk., but distinguished by the radiato-rugulose, bright ferruginous pileus, and the larger spores.



**Stereum latum**, *Cooke & Mass.*

Very broadly effused, resupinate, thin, and following the irregularities of the substratum; margin broadly free all round, but scarcely or not at all reflexed, lobed and repand; pileus velvety-strigose, with numerous narrow concentric ridges, uniform yellowish-cinnamon; hymenium minutely whitish-pruinose, cinnamon with a decided tinge of pink, nodulose in the resupinate portion, due to inequalities of the matrix, smooth in the marginal, free portion; spores colourless, globose, apiculate,  $10\ \mu$  diam.

On dead bark. Perak.

Patches exceeding a foot in length, 6 in. across; free margin, 1-2 in. broad.

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### AUSTRALIAN CHARACEÆ.\*

Now that particular attention is being directed to the Cryptogamic plants of Australia, it is satisfactory to find that the services of Professor Nordstedt have been secured for the illustration of the Characeæ. It is a small group, but if this venture is encouraged it might, in time, lead to the subsidizing of the same excellent Algologist to undertake the Fresh Water Algæ of Australia. The present work is of a large imperial quarto size, and the plates are admirably executed, each plate, with its corresponding text, being capable of being bound, when complete, in any sequence desirable. Of course the letterpress is in English, which will be of considerable advantage in an English-speaking colony, and even in the mother country such a work should be acceptable. We, therefore, strongly commend it to our readers.

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### GREVILLEA.—NOTICE.

For twenty years have we continued, periodically, to issue the numbers of this Journal, as a labour of love; with the next part the twentieth volume will come to a close, and with it the present series. It is not without feelings of regret that this resolution has been taken, but fickle health, increasing years, and diminished vigour have been the excuses which have presented themselves, and we would willingly transfer the work to other hands. Whether some more enterprising proprietor can be found is as yet uncertain; our only concern now is to make known our determination to stand open to any proposal whereby our pecuniary interest shall cease, so that we may rest from the periodical anxieties of the past two decades. Whether we have earned this repose is not for us to determine, but we are never blind to our own failings, any more than to those of others, and can only wish that what we have done had been better done, even although we have endeavoured to do our best.

\* "Australian Characeæ," figured and described by Otto Nordstedt. 4to., Part I., 10 plates (seven shillings). Lund and Berlin, 1891.

## NEW BRITISH FRESH WATER ALGÆ.

Mr. A. W. Bennett has recorded in the "Journal of the Royal Microscopical Society" for February, 1892, the species of Fresh Water Algæ met with in a corner of South West Surrey, which contains a few new or interesting species. Amongst the latter are:—

**Trochiscia pachyderma** (*Reinsch.*) *Hans.* See *Bennett Journ. R. M. S.*, t. II., fig. 1.

**Pediastrum glanduliferum.** *Bennett Journ. R.M.S.*, t. II., figs. 5-7.

Cœnobium elliptical, 300-400  $\mu$ , very dark green, solid, or with only very small intercellular spaces; marginal cells usually pentagonal or hexagonal, with a small semi-circular incision in the external wall, two horned, each horn springing from about midway between the side wall and the incision in the external wall, quite hyaline, and sharply cut off from the endochrome of the cell, very slender capitate; marginal cells about  $12.5 \times 10 \mu$ ; horns about  $15 \mu$  long. The marginal cells somewhat resemble those of *P. Ehrenbergii*, but are not so deeply indented. The shape of the incision and the round knobs at the extremity of the horns distinguish this pretty species from any other in the genus.

Among water-weeds in pond. Frensham.

**Tetmemorus minutus.** *DBy. Conj.*, p. 74, t. v., f. 10. *Bennett Journ. R. M. S.*, t. II., f. 8-9.

Length 45-50  $\mu$ , breadth 15-18  $\mu$ .

Punchbowl, Hindhead.

**Micrasterias rotata**, var. **acutidentata.** *Benn. Journ. R. M. S.*, 1892, t. II., fig. 10.

Terminal lobes of semi-cells bilobulate, with bidentate lobuli. Some of the lobuli of the lateral lobes tridentate, especially those at each extremity. Teeth of terminal lobes much sharper than in the normal form.

Punchbowl, Hindhead.

**Euastrum inerme.** *Lund.*

Punchbowl, Hindhead.

**Cosmarium minutum.** *Benn. Journ. R. M. S.*, 1892, t. II., fig. 11.

Very minute. Length and breadth about 15-18  $\mu$ , semi-cells hexagonal; ends quite straight and parallel, each side representing a nearly equilateral triangle; incision narrow and deep; a large conspicuous pyrenoid in the middle of each semi-cell.

In bog pools.

**Cosmarium Ungerianum.** (*Nag.*), *Arch. Benn. Journ. R. M. S.*, 1892, t. II., figs. 12-13.

Medium size. Outline nearly equilateral triangle. Length 70-80  $\mu$ ; breadth about 75  $\mu$ ; sides 42  $\mu$ ; very nearly straight, or slightly convex, with rounded base; ends 42  $\mu$ , quite straight, sinus moderately deep, triangular; membrane rough with pearly

granules, which are wanting at the two extremities; two conspicuous pyrenoids in each semi-cell.

In bog pools. Hindhead.

**Cosmarium Westianum.** *Benn. Journ. R. M. S.*, 1892, t. II., fig. 14.

Medium size. Semi-cells subreniform. Length of frond about  $52\ \mu$ ; breadth about  $50\ \mu$ ; sides  $17.5\ \mu$ ; somewhat converging towards the apex, with about four deep crenations; apex about  $25\ \mu$  long, slightly convex, with five shallow crenations; at the corners, between the sides and the apex, is a bifid projection; sinus rather wide. Membrane quite smooth, but with conspicuous punctations arranged in regular series, wanting in the isthmus. One conspicuous pyrenoid in each semi-cell.

In bog pools. Hindhead.

The species not before recorded for Great Britain, although previously recorded for Ireland, are:—

**Closterium calosporum**, *Wittr.*

**Mesotænium chlamydosporum**, *DBy.*

**Staurostrum aversum**, *Lund.*

The species called *Nostoc hyalinum* (Benn.), *Journ. R. M. S.*, 1887, t. 1, f. 2, is here named *Nostoc opalinum* (Benn.).

## MEMORABILIA.

PILOCRATERA ENGLERIANA, *Henn. in Engl. Bot. Jahr.*, 1891, p. 363, pl. VI., fig. 9, seems to be *Trichoscypha Hindsii* (Berk.) Cooke Myco., f. 200.

ENDOCONIDIUM AMPELOPHILUM, *Pat. Bull. Soc. Myc. de Fr.*, VII., 1891, p. 183. Can any one demonstrate how the genus *Endoconidium* (Pr. & Del.), differs from *Bloxamia* (B. & Br.), at least as interpreted by Patouillard?

## TRANSACTIONS OF THE YORKSHIRE NATURALISTS' UNION.

Although not containing anything of interest to Cryptogamic Botanists, we have to call attention to the above useful Transactions, and especially to Parts 11, 12, 13, and 15, which contain a second edition of "North Yorkshire; studies of its Botany, Geology, Climate, and Physical Geography," by J. G. Baker, F.R.S. The portion issued consists for the most part of the Introduction, and the essays on the Geology, Lithology, Climatology, Topography, and Physical Geography, with descriptions of the several districts. This is certainly a valuable contribution to local scientific literature, and will commend itself to all who are interested in the "big county."

## NEW BRITISH FUNGI.

BY M. C. COOKE.

(Continued from p. 38).

**Agaricus (Collybia) bibulosus, Massee.**

Pileus (1-2 in. across) fleshy, subglobose, obtuse, then expanded, moist, very smooth and even, dark obscure green when moist, pale grey or whitish when dry. Stem cartilaginous, spongy, stuffed, becoming imperfectly hollow, tapering upwards, minutely fibrillose-striate ( $1\frac{1}{2}$ -2 in. long,  $\frac{2}{3}$  in. thick at base), pale clear brown, darkest below. Gills narrow, crowded, thin, margin rather undulate, dingy, slightly adnexed, separated from the flesh of the pileus by a dark cartilaginous line, which is a continuation of the outer portion of the stem; spores subpyriform ( $6 \times 3 \mu$ ).

On stumps. Burnham Beeches.

In groups of 2 to 4, pileus very bibulous, changing from blackish green to pale grey when drying, rooting into the wood. Allied in many respects to *Ag. butyraceus*.

Mr. Worthington G. Smith informs us of his knowledge of the following species having been found in Britain.

**Agaricus (Tricholoma) coryphæus, Fr. Hym. Eur. 48. Vent. t. 36, f. 1-3.**

On the ground. Morpeth.

**Agaricus (Pluteus) umbrinellus, Somm. Fr. Hym. Eur. 188.**

On the ground. Shrewsbury.

**Agaricus (Entoloma) pluteoides, Fr. Mon. II., 345. Fr. Hym. Eur. 195.**

On rotten wood. Morpeth.

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# Grevillea.

A QUARTERLY RECORD OF CRYPTOGAMIC BOTANY  
AND ITS LITERATURE.

## RUSSULA REDIVIVA.

(Continued from p. 81.)

**FURCATÆ.** *Fries Hym. Eur.* 441.

Pileus compact, firm, covered with a thin, closely adnate pellicle, which at length disappears. Margin abruptly thin, at first inflexed, then spreading, *acute, even*. Stem at first compact, at length spongy-soft within; gills *somewhat forked*, with a few shorter ones intermixed, commonly attenuated at both ends, thin and normally narrow.

**1189. *Russula (Furcatæ) olivascens.*** *Fr. Hym. Eur.* 441. *Fr. Mon.* II., 187. *Fries Icones.* t. 172, f. 2. *Cooke Hdbk.* VI., p. 321. *Cooke Illus.* t. 1035. *Sacc. Syll.* v., 1797. *Krapf.* I., t. 9. ?

Pileus everywhere fleshy, flattened, umbilicate, olivaceous, the disc becoming yellow, margin even, stem firm, even, white, gills attenuated behind, crowded, almost equal, white, becoming yellowish; spores ochraceous.

Amongst grass.

This noble species from its habit is placed with *Furcatæ*, probably the rarely furcate gills approach to *Fragiles*. In many other respects it agrees with *Compactæ*.—*Fr. Hym. Eur.* 441.

Stem firm, but spongy within,  $1\frac{1}{2}$  in. long, 1 in. thick, even, white. Pileus convex, then flattened, umbilicate, everywhere fleshy, margin even, 2 in. or a little more diam., olive, becoming yellowish at the disc. Flesh rather thick, white. Gills attenuated behind, touching the stem, crowded, broader in front, subequal and rarely furcate, white, then becoming yellowish, taste mild. This species agreeing in many points with *Compactæ*, but with a different habit, is referred to *Furcatæ*. The form of the gills approaches to *Fragiles*, but the pileus to this section.—*Fries Mon.* p. 187.

SPORES.— $8-10 \times 6-8 \mu$  (Britz.);  $8-10 \times 6-8 \mu$  (Sacc.);  $8 \mu$  diam. (Quel.);  $11-12 \mu$  (Massee).

Fries does not consider this to be *R. olivascens*, Pers. or Secretan, No. 498, which he refers to *Russula alutacea*.

**1190. *Russula (Furcatæ) furcata.*** *Pers. Syn. Fries Hym. Eur.* 441. *Mon. Hym.* II., 187. *Stevenson B. F.* II., 116. *Secr.* 515, 518. *Sacc. Syll.* 1798. *Cooke Hdbk.* I., 616; II., 1190. *Cooke Illus.* t. 1036. *Krombholz* t. 62, f. 1, 2; t. 69, f. 18-22. *Schæff.* t. 94, f. 1. *Bulliard* t. 26. *Paulet* t. 74, f. 1. *Barla* t. 16, f. 1-9. *Harzer* t. 54; t. 63, f. 5.

Mild, then rather bitter; pileus fleshy, rigid, plano-gibbous, then depressed and infundibuliform, *even, overspread with a silky lustre*, and becoming smooth, margin even, acute; stem stout, firm, *even*, attenuated downwards; gills *adnate-decurrent*, rather thick, somewhat distant, furcate, pure white.

In woods.

Allied rather to *R. rubra* than to *R. virescens*, but differing from these in the form of the pileus, acute margin at first inflexed, separable pellicle, which does not break up into warts, and in the type of the gills. Pileus sometimes umber or bright green, but it is also fuscous, becoming whitish.—*Fries Hym. Eur.* 441.

**OBS.**—Barla's figures are of too bright and grassy a green to represent the usual form of this species well, and the same remark applies to the bright coloration of Viviani's t. 60, and Krombholz's t. 62, f. 1, 2.—*M. C. C.*

**SPORES.**—6-7  $\mu$  (C. B. P.); 8-9  $\mu$  (Britz.); 7-8  $\mu$  (Sacc.)

Taste becoming bitter. Stem solid, firm, 2 in. or more long, equal or attenuated downwards, even, white; pileus fleshy, compact, gibbous, then plano-depressed or funnel-shaped, even, smooth, but often having a silky lustre, 3 in. broad, either æruginous green or umber turning greenish, but variable in colour. Pellicle of the pileus separable here and there. Margin thin, at first inflexed, then patent, always even. Flesh firm, rather cheesy, white; gills adnate, decurrent, rather thick, somewhat distant, broad, attenuated at both ends, frequently forked, white.—*Fr. Mon.* 188.

Pileus of a sombre green, unequal in tint, darkest in the centre, lighter at the margin, dull like cloth, successively convex, with the centre a little elevated, then plane, and at length concave. Sometimes excentric. Diam. 4 in. Flesh white, cheesy, brittle, 5 lines thick, vinous red under the cuticle, which is easily separated. Gills white, not very numerous, firm, fragile, 4 lines wide, frequently bifurcate or trifurcate at different lengths, concave, straight, or convex, following the form of the pileus, all of them bifid at the same distance from the stem, some dimidiate. Stem white, 3 in. long, 9-10 lines thick, cylindrical, straight, a little attenuated and curved at the base, solid. Whole plant firm and brittle. Odour bad.—*Secr.* No. 515.

**var. pictipes.** *Cooke Hdbk.* II., p. 321. *Illus.* t. 1086.

Pileus convex, then expanded, depressed in the centre, dark olive green, margin acute, and when fully mature faintly striate.

Stem firm, stuffed and soon spongy within, and white, long, commonly attenuated downwards, rosy or purple at the apex, tinged with greenish at the base, flesh beneath the cuticle and gills near the margin tinged with rose or purple, gills adnate or subdecurrent, rather thick, furcate, white.

Under trees.

Pileus as much as 5 or 6 in. in diameter, stem 4 or 5 in. long, an inch or more thick at the apex, gradually attenuated downwards. Taste mild. Spores white, subglobose,  $8\ \mu$  diam. Cuticle separable at the margin, rosy beneath.

This variety differs from the typical form in the faintly striate margin, persistently mild taste, and in the stem being tinged with rose or rosy purple at the apex, and greenish at the base.—*M. C. C.*

var. **graminicolor.** *Secr. No. 518.*

Differs only in the pale green or grass green colour of the pileus, and hardly deserves to be regarded as a variety. The following is the brief description:—

var. A.—Pileus pale green, meadow green, darker at the centre, dull, but not tessellated, convexo-plane, centre a little depressed. Diam. 7-8 in. Gills white, thick, 6 lines wide, often furcate. Stem 4 in. long, 1 in. thick, white, a little curved and attenuated at the foot.

var. B.—Pileus a fine grass green, gills white, soft to the point of being reduced to a paste. This is smaller than var. A.

var. **ochroviridis.** *Cooke Hdbk. II., p. 322. Illus. t. 1100.*

Pileus fleshy, flattened, then depressed (4 in. or more), at first viscid, polished when dry, with a thin adnate pellicle, ochraceous towards the margin, disc olivaceous or fuliginous, margin spreading, even, acute; stem short, thick, 2 in. long, 1 in. thick, reticulately rugose, white, rarely growing pallid, flesh fuliginous or cinereous when cut, stuffed, spongy within; gills attenuated both ways, lanceolate (6 m.m. broad in the centre), crowded, many furcate, white, becoming a little dirty white when old. Spores white, subglobose,  $9 \times 7\ \mu$ , faintly granular. Taste mild.

On the ground.

Obs.—It resembles *R. ochroleuca* in the rugose stem, but this differs in not becoming cinereous, also in the dark dingy olive centre of the pileus, narrow gills, discoloration of the flesh, mild taste, and large size. In habit it resembles *R. furcata*, but differs in the paler greenish-ochre pileus, narrower gills, rugose stem, and discoloured flesh. It differs also from *R. aeruginea* in the margin not being striate, in the stem being short and rugose, and in the gills being crowded.

Spores  $9 \times 7\ \mu$ .—(*M. C. C.*).



**1191. *Russula (Furcatæ) sanguinea.*** *Bull. Champ. t. 42. Fr. Mon.* II., 188. *Fr. Hym. Eur. 442. Sacc. Syll. 1800. Secr. No. 505?* *Stevenson II., 116. Cooke Hdbk. I., 617; II., 1191. Cooke Illus. t. 1019.*

Acrid, pileus fleshy, firm, convex, gibbous, then depressed and infundibuliform, turning smooth, moist, margin thin, acute, even, stem spongy, solid, rather striate, white or reddish; gills decurrent, thin, very crowded, somewhat furcate, connected, white.

In moist grassy places in woods.

Wholly different from *R. rubra*, flesh solid, firm, gills adnate, then deeply decurrent, very narrow, acuminate behind, stem at first constricted above. Pileus commonly blood-red, or chiefly about the margin becoming whitish.—*Fr. Hym. Eur. 442.*

Taste acrid, peppery, stem stout, spongy, stuffed, at first at the apex contracted, then equal, finely striate, white or reddish, pileus fleshy, firm, at first convex, obtuse, then depressed, infundibuliform, and the centre commonly gibbous, polished, even, moist in wet weather, 2-3 in. broad, blood-red or growing pale about the even patent margin. Flesh firm, cheesy, white. Gills at first adnate, then truly decurrent, very much crowded, very narrow, connected by veins, fragile, somewhat furcate, white. Confounded often with *R. rubra* of the same colour, but this is more rigid, flesh grumous, &c., very different.—*Fr. Mon. p. 188.*

The following is Secretan's description, as cited doubtfully by Fries:—

***Agaricus emeticus.*** *Secr. No. 505. Schff. t. 15, f. 4, 5, 6. Batsch. f. 13. Sow. t. 201, red fig.*

Pileus at first white, mixed with cherry-red, then of a lively-red, scarlet; finally the tint varies from cherry-red to fresh blood-red and vermilion, drawing sometimes to vermilion, the centre is at length dark. It approaches convex, then umbonate; often oblong; margin sinuate, at length concave, the margin raised very high, finishing by closing up irregularly above; diam.  $4\frac{1}{2}$  in.; flesh white, cheesy, 6 lines thick.

Gills white at all ages, appearing somewhat numerous, crowded, at last seen separate and held to the bottom by large veins. They are slender, fragile, 4-6 lines wide, anastomosing, furcate near the stem, they following the forms of the pileus and adhering to the stem at unequal heights.

Stem nearly a dull white, it takes by-and-bye a rosy tint, or red, which in old age sometimes cover it entirely. It is  $3\frac{1}{2}$  in. long, 9-10 lines thick, straight or curved, swollen at the foot, when old it is attenuated conically at the base. It becomes hollow as the flesh is destroyed by insects. Solid when of a prime age. Summer and autumn.

Obs.—By an unfortunate mistake the synopsis of Persoon quotes here the figs. O. and P. of pl. 509 of Bulliard, which is wrong. The same error is copied by Fries.—*Secr. 505.*

NOTE.—This species should be readily distinguished, amongst the red species, by the decurrent gills, as shown in Bulliard's figure. Krombholz, t. 65, f. 1-6, is not of the right colour, and the gills are not decurrent.—*M. C. C.*

**1192. *Russula (Furcata) rosacea.*** *Fr. Hym. Eur.* 442. *Fr. Mon.* II., 188. *Berk. Outl.* 210. *Cooke Hdbk.* I., 618; II., 1192. *Sacc. Syll.* 1801. *Stevenson B. F.* II., 116. *Bull. t.* 509, f. Z. = *Ag. exalbicans*, *Secr.* 512 (*variety*). *Cooke Illus. t.* 1020.

*Slowly acrid.* Pileus compact, convex, then plane, *unequal, viscid, then dry, variegated with spots, margin acute, even*; stem spongy or solid, even, white or reddish; gills adnate, rather crowded, plane, unequal, white, divided behind.

In fir woods.

Allied to *R. sanguinea*, but irregular, often excentric, pileus subrepand, *scarcely depressed*, gills less crowded, broader, less divided, scarcely connected. The colour varies in intensity from flesh-colour, viscid pellicle growing pale, blotched with darker spots.—*Fr. Hym. Eur.* 442.

Taste slowly acrid. Stem solid, firm, internally at length spongy, even, smooth, 2 in. long, sometimes ventricose, white or reddish. Pileus compact, fleshy, at first convex, then expanded, obtuse, but never depressed, commonly unequal, repand, even, incised, 2-4 in. broad, pellicle in moist weather viscid and separable, but when this disappears the pileus is whitened, often variegated with darker spots. Flesh firm, cheesy, white. Gills in all states adnate, thin, crowded, fragile, furcate behind, with dimidiate intermixed, always persistently white.—*Fr. Mon.* 188.

SPORES.—7  $\mu$  (W. G. S.); 8-9  $\times$  6-7  $\mu$  (Britz.); 8-9  $\times$  6-7  $\mu$  (Sacc.)

var. *exalbicans.* *Secr.* No. 512.

Emerging from the ground the pileus is white, a little yellowish, streaked on one side with a very faint rose tint; then it is white, the centre yellowish and shining. Sometimes the purple colour is confined to one side, sometimes it prevails at the margin, all round, in old age the coloured tints disappearing almost entirely, and the white turns a little to blackish. It is convex, then plane, the centre depressed, the extremity of the margin finely striate. Diam.  $1\frac{3}{4}$  in. In oldest state the margin is deeply split.

Gills white, in old age turning to yellowish, they are rather numerous, 3 lines wide, adnate. In old age undulated by alternate thickenings, which are most to be remarked near the stem. At the point of adhesion they are fastened by numerous buttresses.

Stem all white,  $1\frac{3}{4}$  in. long, 7-9 lines thick, swollen conically at the summit, a little thickened at the foot. It is shining, solid, so is in general all the plant.

OBS.—This species, more or less shining, should be distinguished with care from *R. roseo-granulata*.—*Secr.* 512.

NOTE.—The figures of Krapf, Heft. I., t. 1, figs. 1 to 7, may, perhaps, belong to this species.

- 1193. *Russula (Furcatae) maculata.*** *Quel. & Roze Soc. Bot. Fr.* 1877, 323, *t. v.*, fig. 8. *Sacc. Syll. No.* 1804. *Cooke Hdbk. II.*, No. 1193. *Cooke Illus. t.* 1069.

Pileus solid, convex, plane, viscid, reddish flesh-colour, pallid, then decoloured, spotted with purple or brown, margin undulate, and sometimes darker (5-9 c.m. diam.). Flesh white, *peppery*, and smelling of rose; stem short, solid, striato-reticulate, white or somewhat rosy, then spotted with ochre; gills attenuate, adnate, furcate, *pale sulphur*, then *peach colour*.—*Quelet*.

In woods.

OBS.—Evidently resembling *R. depallens*, but *acid*, and with coloured gills, but without a grey stem.

SPORES.—10  $\mu$  (Sacc.)

- 1194. *Russula (Furcatae) sardonias.*** *Fr. Hym. Eur.* 442. *Fr. Mon. II.*, 189. *Cooke Hdbk. I.*, 69; *II.*, 1194. *Cooke Illus. t.* 1037. *Berk. Outl.* 211. *Sacc. Syll.* 1802. *Stevenson II.*, 117. *Seer.* 509. *A. aureus, Kromb. t.* 68, *f.* 1-4. *Schæff. t.* 16, *f.* 56. *Bresadola t.* 44.

Pileus fleshy, firm, convex, then plane and depressed, smooth, pellicle thin, adnate, viscid, becoming decoloured, *margin even*, stem spongy, solid, short, *white or reddish*, gills adnate, *much crowded*, subfurcate, white, then *yellowish*.

In pine woods by waysides.

Firm, irregular, colour of gills and stem distinct from *R. rosacea*. *Gills weeping* in wet weather, and in dry marked with yellowish spots.—*Fr. Hym.* 442.

Species robust, firm, but not large. Stem solid, firm, but internally at length spongy,  $1\frac{1}{2}$ -2 in. long, 1 in. thick, even, white, or reddish. Pileus fleshy, compact, convex, then plane, rarely depressed, but here and there repand, even 2-3 in. broad, pellicle adnate, viscid in moist weather, soon decoloured, and then often spotted. Colour very mutable, now red, now pallid, spotted yellow, now dingy yellow, opaque. Flesh as in *R. rosacea*. Gills adnate, crowded, broad, somewhat furcate, white, in wet weather weeping drops of water, hence spotted yellowish when dry. Holds a place between *R. rosacea* and *R. depallens*, but in the yellow colour distinct from both.—*Fr. Mon.* 189.

SPORES 8-10  $\times$  8  $\mu$  (Britz.), 8-10  $\times$  8  $\mu$  (Sacc.).

- Agaricus versicolor rubra.*** *Seer.* 509.

Pileus approaches a fine red, blood colour, lively crimson, then a bright rose, it is afterwards discoloured by large white patches, turning yellowish, the patches sometimes occupying the centre, sometimes, and more commonly, the margin. In old age the pileus has the patches of a glossy yellow, and ultimately entirely of this colour. It is in good time convexo-plane, the margin creased, the upper part humped (umbonate), and finally the centre is depressed, more or less. Diam.  $2\frac{1}{2}$ -3 in. It exhibits no striæ. Flesh white, red under the epidermis, it is conical, six lines thick, soft cheesy, gnawed in good time by the worms.

Stem of a rose-tint, especially at the summit, and often only on one side ; the base takes a yellow tint. It is  $1\frac{3}{4}$ - $2\frac{1}{4}$  in. long, 7-9 lines thick, the foot slightly curved and thickened. The flesh the same as the pileus. The stem is soft, the interior soon destroyed. The odour a little penetrating.

Gills white, taking soon a yellowish glance, changing. In perishing it offers yellow spots, especially at the edge of the pileus. They are very numerous, concave or convex, following the inflexion of the pileus, annexed, slender, anastomosing, bifid, 2-3 lines broad, with the largest breadth at the middle.—*Secr.* 509.

OBS.—Of the two forms which occur, the yellow is most common in this country ; the red is represented in the figures of Bresadola and Schæffer, and one of the figures of Krombholz.—*M. C. C.*

**1195. *Russula (Furcatae) depallens.*** *Fr. Hym. Eur.* 442. *Fr. Mon.* II., 189. *Pers. Syn.* 440. *Cooke Hdbk.* I., 620 ; II., 1195. *Cooke Illus. t.* 1021. *Sacc. Syll.* 1803. *Stevenson* II., 117. *Berk. Outl.* 211. *Russula luteo violacea, Kromb. t.* 66, f. 12. *Secr.* 510. *Gillet Hymenomyces.*

Mild. Pileus fleshy, firm, *undulate, deformed*, even, opaque, thin, viscid pellicle adnate, here and there growing pale, margin without striæ, at length faintly striate, stem firm, attenuated downwards, *white, becoming cinereous*, gills adnexed, crowded, fragile, forked behind, whitish.

Amongst moss.

Pileus at first reddish or fuscous, soon, chiefly at the disc, turning whitish, yellowish, etc. Edible.—*Fr. Hym. Eur.* 442.

In woods chiefly of birch, by grassy waysides.

Inodorous ; taste mild. Stem solid, firm, commonly attenuated downwards,  $1\frac{1}{2}$  in. long, white, when old becoming cinereous. Pileus fleshy, firm, convex, then plane, rarely depressed, but commonly undulately deformed, even, the thin adnate pellicle principally decoloured at the disc. Margin patent, even, when exolete striate. Colour of the pileus at first pallid red or fuscous, then whitish or yellowish, in all states opaque. Flesh white. Gills adnexed, broad, crowded, distinct, but commonly furcate at the base, often mixed with shorter. Approaching *Heterophyllæ*.—*Fr. Mon.* 189.

Stem solid, about  $1\frac{1}{2}$  in. long. Pileus rarely depressed, but often undulate, at first pale-reddish or brownish, then whitish or yellowish, in all states opaque. Flesh white, mild. Gills forked at the base, with shorter ones intermixed.—*Cooke Hdbk.* I., 620.

***Agaricus depallens.*** *Secr. No.* 510. *Paul. t.* 75, f. 6, 7, 8. *Bull. t.* 42.

Pileus of a false red, turning to crimson, deep and dull rose, dull, without striæ. It is quick to decolour, presently by motley spots, or presently by the whole entire turning dull white, so as not to be recognizable. It is, according to age, convex, plane,



and finally concave. Diam. 4 in. Flesh white, 6 lines thick, conical.

Gills white, turning dull white, numerous, slender at the edge, singularly fragile, 4 lines broad, straight or convex, adnate; a few short gills. They are much veined, anastomosing.

Stem covered below with a rose-tint, at length with an ashy-grey lustre, 2 in. long, 6-9 lines thick, straight, attenuated and recurved at the foot. It remains for a long time very hard, but at length it becomes hollow, because the interior is devoured by insects. Flesh is ashy-grey. Very distinct species.

Under firs.

Obs.—Persoon cites for his *A. depallens* Schæffer's t. 112, which is manifestly a false impression, and which was copied by Fries in his Obs. Myc. i., p. 69. It is the plate 92 of Schæffer which he would have cited, which appears to belong rather to my *A. hemerocalle*, var. *A.* (No. 508, *R. emetica*).—*Secr.* 510.

NOTE.—This is undoubtedly a common species with us. The purplish-red and soon decoloured pileus, with the stem becoming cinereous, readily distinguish it. *R. maculata* has a superficial resemblance, but that species is not mild, the gills are coloured, and the stem does not become cinereous.—*M. C. C.*

**1195 bis. *Russula (Furcatæ) virginea.*** *Cke. & Mass. Grevillea* xix., 4. *Cooke Illus. Supp. t.* 1197.

Mild. Pileus fleshy, firm, convex, then depressed (5 c.m. diam.), smooth, even, viscid when moist, polished when dry, margin even, snow-white. Stem attenuated upwards, firm, solid (5 c.m. long, 2 c.m. thick at the base), finely rugulose; gills very narrow, crowded, subdecurrent, repeatedly forked, connected by veins, brittle, as well as the stem quite white. Spores globose, 4  $\mu$  diam.

Under trees.

Obs.—This species cannot be referred to *Russula lactea*, by reason of the narrow, crowded, and decurrent gills. Neither can it be considered as an albino form of *R. sanguinea*, by reason of its mildness. Although hitherto found but once, it has all the appearances of a good and distinct species.

**1196. *Russula (Furcatæ) purpurea.*** *Gillet Hymen. Ser. XI., pl. x. Sacc. Syll. No.* 1805. *Cooke Hdbk.* II., 1196. *Cooke Illus. t.* 1022.

Pileus fleshy, at first hemispherical, then convex, and more or less depressed in the centre, rugoso-plicate, dark purple, centre darker, margin even, or soon striatulate (6-10 c.m.). Flesh yellowish, red under the cuticle; stem slightly incrassated at the base, longitudinally striate, apex white, middle rosy, base yellowish. Gills rounded, broad, often bifid, white, then yellowish = *Sacc.*

Under spruce.

Spores 8-10  $\times$  8  $\mu$  (Sacc.).

Obs.—Undoubtedly this is closely allied to *Russula cœrulea*, and sometimes difficult to distinguish, but the gills do not become so

distinctly yellow, and the spores are smaller. The roseate tint on the stem, about the middle, is sometimes faint or obsolete. Although not mentioned in the original description, our specimens were rather mild, and the pileus slightly viscid.—*M. C. C.*

**1197. *Russula (Furcatæ) cœrulea.*** *Pers. Syn.* 445. *Fr. Hym. Eur.* 443. *Fr. Mon.* II., 205. *Sacc. Syll.* 1806. *Cooke Hdbk.* II., 1197. *Cooke Illus.* t. 1052. *Price f.* 124 (but gills white). *Krombh.* t. 64, f. 10-11; t. 68, f. 5-8.

*Mild.* Pileus fleshy, convex, then flattened or depressed, polished, *margin even*; stem spongy, solid, firm, white; gills adnate, subequal, turning yellowish, acute at the apex.

In woods of birch.

Pileus becoming bluish, subrufescent or fuscous, blue at the middle.—*Fr. Hym. Eur.* 443.

In birch woods. To me its place is uncertain. Very possibly the habit of *R. cyanoxantha*, taste mild, but gills crowded, yellow. Colour of the pileus cœrulean or purple lilac; margin even.—*Fr. Mon.* 205.

SPORES 8-10 × 8  $\mu$  (Britz.).

OBS.—Whether Mrs. Price's figure (124), with white gills, should be referred to this species may be open to doubt. We have never seen a *Russula* with such a decidedly blue pileus. Quelet ("Especies nouvelles," 1882) has a species which he calls *R. palumbina*, Paulet, and bases it upon Paulet's t. 76, f. 2-3. Of this he says *R. grisea*, *R. cœrulea*, and *R. olivascens*, Pers., are varieties. Saccardo refers Quelet's species to *Russula suavis*, Schulz., and retains the three species intact which Quelet absorbs.—*M. C. C.*

**1198. *Russula (Furcatæ) drimeia.*** *Cooke Grevillea* x., p. 46. *Cooke Hdbk.* II., 1198. *Cooke Illus.* t. 1023. *Sacc. Syll.* 1807. *Stevenson* II., 118.

Acrid, peppery. Pileus compact, firm, convex, then depressed, scarcely viscid when moist, opaque when dry, bright purple (2-4 in. diam.), margin subincurved, even; stem solid (2-3 in. long,  $\frac{1}{2}$ - $\frac{3}{4}$  in. thick), firm, cylindrical, equal, tinged with purple; gills adnexed, scarcely crowded, narrow and furcate at the base, at first pale sulphur yellow, then deeper yellow, never white; spores pale ochre.

On the ground under larch.

OBS.—So intensely peppery that after tasting a small fragment the tongue tingled for more than half-an-hour. Colour and habit of *R. Queletii*, but distinguished by the yellow gills, ochraceous spores, and intense peppery taste.—*M. C. C.*

## ADDITIONAL FUNGI DESCRIPTIONS.

By M. C. COOKE.

**Poria albo-cincta**, Cke. & Mass.

Tota resupinata, atro-cinerea, demum fissurato-fatiscens; margine lato, niveo, pulverulento, tenui; tubulis circa 1 m.m. longis, poris minutissimis, inconspicuis. Sporulis ellipticis,  $4 \times 2 \mu$ .

On bark. St. Vincent.

**Cystopus euphorbiæ**, Cke. & Mass.

Soris plerumque cauliculis, oblongis, confluentibusque, in plagas atrofuscas insidentibus; conidiis subglobosis vel oblongis  $12 \times 8 \mu$ , achrois, membrana minute asperulo, subcrasso; oosporis subglobosis, lævibus, succineis,  $15 \times 12 \mu$  (junior).

On *Euphorbia hebecarpa*. Persia, east of Bactiary country, Kuh Bul, 11,000 feet. (Dr. Stapf.)

**Sphæropsis Hibisci**, Cooke. Sphæria (Obtecta), Berk. in Herb.

Peritheciis gregariis, globoso-depressis, atris, papillatis, inter fibras corticis immersis, epidermide tectis, perforatis ( $\frac{2}{3}$ -1 m.m. diam.). Sporulis ovoideis vel ellipticis, rotundatis, atro-brunneis, opacis,  $12-14 \times 9 \mu$ .

On bark of *Hibiscus Syriacus*. S. Carolina (1491, 1354, 2140.)

**Melasmia ribicola**, Cke. & Mass.

Maculis epiphyllis, pallidis, orbicularibus. Stromatibus effusis, atris (1 c.m. diam.), rugulosis; cellulis immersis; sporulis cylindricis, rectis, tenuibus, hyalinis ( $3 \times 0.5 \mu$ ).

On leaves of *Ribes*. Bolivia.

**Zythia bicolor** (B. & Br.), Cooke & Mass. Ophiotheca bicolor, Berk. & Br. in Herb.

Subsuperficialia, rufo-aurantiaca. Peritheciis subglobosis, fragilibus, lævibus, sporulis ellipticis, minutis, continuis, hyalinis,  $3 \times 1\frac{1}{2} \mu$ .

On fruits of *Nephelium lappaceum*. Ceylon. (Thwaites, 350.)

**Penicillium flavo-virens**, Cke. & Mass.

Cæspitulis densis, effusis, floccosis, flavo-virentibus; hyphis sterilibus repentibus, intricatis, fertilibus assurgentibus, suberectis, ad apicem bifurcatis, strictis. Conidiis concatenatis, ellipticis, minutis, hyalinis,  $3-4 \times 1 \mu$ .

On fruit of *Terminalia belerica*. Ceylon. (Thwaites, 374.)

**Valsa tenebricosa** (B. & Br.). Sphæria tenebricosa, B. & B. in Herb.

Pustulis ellipticis, epidermide nigrificante nitido tectis, demum elongato-fissuratis (*Phyllachoræ subsimulans*). Peritheciis paucis, minutis, in collis brevibus attenuatis. Ascis clavatis, octosporis,  $25 \times 5 \mu$ . Sporidiis allantoideis, rectis vel curvulis, hyalinis,  $4.5 \times 1 \mu$ .

On palm spathe. Ceylon. (636.)

**Nitschkia pauidia**, *B. & C. Sphæria pauidia, B. & C. in Herb.*

Peritheciis in acervulos minutos aggregatis (3-8), vel confluentibus, subglobosis, atris, opacis, epidermide fissurato erumpentibus. Ascis clavato-cylindræis, sporidiis allantoidæis, curvatis, continuis, hyalinis,  $7-8 \times 2 \mu$ .

On branches of *Melia*. S. Carolina. (1413.)

The following species require to be located:—

**Ectostroma Liriodendri**, *Schwein. Amer. Bor.* 1951.

**Ectostroma annonæ**, *Schwein. Amer. Bor.* 1954.

**Ectostroma petiolaris**, *Schwein. Amer. Bor.* 1955.

We have not succeeded in finding fruit in the specimens.

**Dothidea exasperans**, *Schw. Syn. Car.* 220. *Syn. Amer. Bor.* 1890.

**Dothidea moriformis**, *Schw. Amer. Bor.* 1867.

Seems to be a *Plowrightia*, with uniseptate sporidia about  $10 \times 4.5 \mu$ .

We have been unable to find any clue to descriptions of the following species from Schweinitz:—

**Dothidea pandani**, *Schwz.*

On leaves of *Pandanus*. Surinam.

**Dothidea lobata**, *Schwein.*

On leaves. Surinam.

**Dothidea aroidearum**, *Schwein.*

On leaves of Aroids. Surinam.

**Dothidea Horsfieldii**, *Schwein.*

On leaf. Java.

**Physalospora ventricosa** (*DR. & M.*) *Dothidea ventricosa, DR. & Mont. in Herb. Berk.*

Peritheciis sparsis, innatis, tectis, globosis, atris, papillatis. Ascis clavatis, breviter stipitatis. Sporidiis ellipticis, utrinque apiculatis, hinc eunotiæformibus, continuis, hyalinis,  $15 \times 8 \mu$ .

On stems of *Ricinus*.

**Dothidea aspera**, *DeNotaris in Herb. Berk.*

On *Ribes aureus*. Genoa.

Has asci, but the sporidia are immature. It has the habit of *Dothidea*. The trivial name appears to be *aspera*, but it is not distinct.

## BERLESE, ICONES FUNGORUM.\*

The second fasciculus, which Dr. A. N. Berlese has just issued, in continuation of his coloured figures of the Sphæriaceæ, completes the Phæophragmiæ. This work will be indispensable to all who devote themselves to the study of the Pyrenomycetes, because the figures are well executed, apparently characteristic, and have been drawn from authentic specimens of the species which they

\* Icones Fungorum, ad usum Sylloges Saccardianæ accomodatæ Auct. A. N. Berlese. Fasc. II., 43 col. plates. Padua, 1892.



represent, and the measurements of the sporidia given, purport to be derived from original sources. We have often urged that systems may change, names may be superseded, but good and faithful representations, executed from authentic and well determined specimens, will last for ever. Whatever our individual opinions may be of the limits of genera or species, this does not affect the value of a work of this kind, which was worth doing, and worth doing *well*. We regret to observe so many illustrations of fungi, in all orders, which have been issued of late years, failing in their object, because roughly or imperfectly executed, or because drawn from specimens not well authenticated. Our author has evidently appreciated these failures, and set himself at work to escape any such charge, and in this he seems to have succeeded. We wish him well in his useful and arduous undertaking, and trust that he will continue to pursue it in the same spirit to the close. At p. 86 is a rather long list of described species of *Leptosphaeria*, which at present could not be figured for lack of authentic material. Let us hope that mycologists will assist Dr. Berlese in his laudable enterprise, by communicating authentic specimens, so that many of these may yet find a place in the promised "Appendix."

### OMITTED DIAGNOSES.

We have failed to trace the following species in Saccardo's "Sylloge":—

**Puccinia agrostidis.** *Plow. in Sydow Uredineen, No. 408.*

**Puccinia andropogonis.** *Fekl. Symb. 59. Fungi Eur. 2175, 1891. Thum. Myc. Univ. 1638. Sacc. Myco. Ven. 477, 478, 865.*

**Puccinia balsamorhizæ.** *Peck. Bot. Gaz. vi., 276.*

**Puccinia Bigelovii.** *E. & E. in N. A. Fungi 2248.*

**Puccinia callixinæ.** *Berk. in Cooke Handbk. Austr. Fungi, p. 409.*

**Puccinia cellulosa.** *Berk. & Curt. Sphaeria canaliculata, Schwein.*

Teleutosporis fusiformibus, arcte cohærentibus, medio septatis, pallide fuscis,  $28-30 \times 8 \mu$ , episporio ad apicem incrassato, pedicellis brevibus, persistentibus.

Ad culmos *Cypero*. U.S.A.

**Puccinia circinans.** *Fekl. Fun. Rhen. 1674.*

**Puccinia compacta.** *Kunze. in Wiegelt's Exs.*

Surinam.

**Puccinia concentrica.** *Schwein. Amer. Bor. 2918.*

**Puccinia confusa.** *Burrill U. S. Fungi.*

**Puccinia cryptica.** *Cooke in Herb. Kew.*

Soris hypophyllis, sparsis, tomento denso tectis; teleutosporis lanceolatis,  $50-60 \times 28-30 \mu$ , fuscis; episporio crasso, lævi, ad apicem incrassatis et apiculatis, pedicellis longissimis ( $100 \mu$ ) hyalinis.

On leaves of *Stobæa*. Cape.

**Puccinia cucumis.** *Henn.*

Abyssinia.

**Puccinia gregaria.** *Kunz. in Wiegelt's Exs.*

Surinam.

**Puccinia hysterina** (*Str.*). *Rohl. Deut. Fl.* 3, p. 131.

**Puccinia imperatoriæ-sylvestris.** *West. in Fun. Gallici* 3713.

**Puccinia jurinæ.** *Fckl. Fun. Rhen.* 345.

**Puccinia lateritia.** *Schwein. Journ. Acad. Sci.* 1853, p. 281.

**Puccinia lamii.** *Lib. in Fun. Gall.* 1237.

**Puccinia Lecokiæ.** *Kotschy. in Ung. et Kotsch. Ins. Cypern.*

**Puccinia mesembryanthemi.** *MacOwan.*

I.—*Fungus hymeniferus.* Acervulis plerumque cauliculis, sparsis, caulem sæpe cingentibus, aurantiacis, subiculo vix incrassato; pseudoperidiis confertis, cylindricis, circa .2 unc longis, ore tenui lacero; sporis globosis interdum subangulatis, diam. circa .00114 unc. dilute flavis, episporio lævi.

II.—*Fungus stylosporiferus.* Adhuc ignotus.

III.—*Fungus teleutosporiferus.* Pulvinulis cauliculis foliicolisve, sparsis, paucis, primo sub epidermide arescente tectis, tum hiantibus, lanceolatis, .5-2 lin. longis, fusco-atris, nitidis, dein erumpentibus, amorphis; sporis ellipticis, medio vix constrictis, longe pedicellatis, circa .0021 unc. longis, .001 latis; pedicello hyalino, fragili, .002-.0024 unc. longo, sursum incrassato, episporio lævi. apicem versus crassiore. (*P. MacOwan.*)

In caulibus foliisque vivis, *Mesembryanthemi micranthi.* Cape.

**Puccinia pallido-maculata.** *E. & E. N. A. Fungi*, No. 2234.

**Puccinia recondita.** *Rob. in Desm. Crypt. Exs.* II., 252.

**Puccinia Schweinfurthii.** *Henn.*

Abyssinia.

**Puccinia solani.** *Schwein Journ. Acad. Nat. Sci.* (1853), p. 281.

**Puccinia Sydowiana.** *Zopf. in Sydow. Myc. March.* 40.

**Puccinia synedrellæ.** *Lager. in Sydow. Ured.* 376.

**Puccinia torosa.** *Thum. Myc. Univ.* 1725.

**Puccinia typhæ.** *Kalch. in Rabh. Fun. Eur.* 695.

**Puccinia vexans.** *Plow. in Vize. M. F. Britt.* 433.

**Puccinia Wrightii.** *B. & C. in U. S. Expl. Exped.*

**Uredo abietis-canadensis.** *Farlow in N. A. Fungi*, No. 1882.

**Uredo Cosmeæ.** *Lowe.*

On *Cosmeæ leucantha.* Madeira.

**Uredo cyclostoma.** *Lev.*

On *Conyza.* Chili.

**Uredo digitariæcola.** *Thum. Myc. Univ.* 2041.

**Uredo hyptidis.** *B. & C. (? U. labiatarum).*

On *H. radiatum.* Santee River.

**Uredo leguminum.** *Desm. Crypt. Exs.* 934.

**Uredo myrtacearum.** *Pazs. in Fun. Eur.* 3633.

**Uredo Peckii.** *Thum. Myc. Univ.* 538 (*U. æcidioides. Peck.*).  
U.S.A.

**Uredo sphærospora.** *B. & C.*

On *Panicum*. Pennsylvania.

**Uredo terebinthinaceæ.** *Schwein. Syn. Car. 473.*

**Uredo ustulata.** *B. & C.*

On *Cyperus*. Santee River.

**Uredo Wrightii.** *B. & C.*

On *Croton*. Texas.

**Uredo Zornia.** *Berk.*

On *Zornia*. Mauritius.

**Æcidium cassiæ.** *E. & K. in N. A. Fungi 1825.*

**Æcidium chelones.** *Gerard. Bull. Torr. Club v., 40.*

**Æcidium flustra.** *Berk.*

On *Aster*, etc. Valparaiso. Natal.

**Æcidium fædiæ.** *Bals. Erb. Critt. Ital. 597.*

**Æcidium hippophaes.** *Berk.*

On *Hippophae*. Thibet.

**Æcidium Hibisci.** *Cooke.*

Hypophyllum; maculis indistinctis vel obsoletis; pseudoperidiis gregariis in cæspitibus suborbicularibus, plerumque circinantibus, semi-immersis, albidis, pro ratione minoribus; æcidiosporis subglobosis, pallidis, 10-12  $\mu$  diam.

On leaves of *Hibiscus cannabinus*. Natal. (Wood, 3495.)

The colour of spores when living not stated, above description from dried specimens.

**Æcidium phaceliæ.** *Peck. Bull. Torr. Club XI., 50. N. A. Fungi 2218.*

**Æcidium poterii** (*Grev.*) *Cooke Hdbk. p. 540.*

**Æcidium solanatum.** *Schwein. Journ. Acad. Nat. Sci. II. (1853), 283.*

**Æcidium trachelifoliatum.** *Schwein. Amer. Bor. 2872.*

## THE MYXOGASTRES.\*

When Rostafinski published his Monograph of these organisms, in 1875, it was supposed that the subject was settled, for some time to come. In Natural Science there is no such thing as finality, and it was not long before it was discovered that in this instance there was opportunity for improvement. Suggestions and emendations followed each other, without departing greatly from the systematic method adopted by Rostafinski, and now we are face to face with a "Monograph" which proposes a modification of that method. It will be remembered that, in the former, the primary divisions were the *Amaurosporæ*, with spores violet, or brownish violet, and the *Lamprosporæ*, with spores diversely coloured, never violet. Each of these subdivisions were again subdivided into *Atrichæ*, sporangia without a capillitium, and *Trichophoræ*, sporangia constantly possessed of a capillitium. Under each of these the order, families, and genera were grouped. In his

\* A Monograph of the Myxogastres, by George Massee, large 8vo, 12 coloured plates. London: Methuen & Co. 1892.

Monograph Mr. Masee has dispensed with this primary division, according to the colour of the spores, and proposes an arrangement, in harmony with his ideas of the relationship between the several orders, which may be represented as follows:—

A. Wall of sporangium not incrustated with lime.

1. Capillitium absent, or formed from the wall of the sporangium . . . . . PERITRICHÆ.  
     Wall of sporangium not perforated . . . . . *Tubulinæ*.  
     Wall of sporangium perforated . . . . . *Cribrariæ*.
2. Capillitium originating from a central, usually elongated columella . . . . . COLUMELLIFERÆ.  
     Springing from every part of an elongated columella . . . . . *Stemonitæ*.  
     Springing from the apical portion of a short or elongated columella . . . . . *Lamprodermæ*.
3. Capillitium present, not springing from a columella . . . . . CALOTRICHÆE.  
     Threads free, not anastomosing to form a network . . . . . *Trichææ*.  
     Threads attached by one end, with the free tips more or less branched, or combined to form an irregular network . . . . . *Arcyriæ*.

- B. Wall of sporangium with an external deposit of lime. Capillitium present . . . . . LITHODERMÆE.  
     Threads without lime . . . . . *Didymææ*.  
     Threads containing lime . . . . . *Physarææ*.

The value which is attached to this arrangement may be estimated from the following observations which occur in the Preface:—"Notwithstanding the excellent work initiated by the late Professor de Bary, and continued by Brefeld, Cienkowski, Woronin, Zopf, and others, the life history of the majority of forms is still unknown; hence all attempts at classification, as also the conception as to what constitutes a species, must be considered as tentative. When we are better acquainted with the main lines of development, and lines of variation, also the conditions of determining these variations, it is certain that the main factor in the discrimination of species will not be a one-twelfth oil-immersion objective."

Impressed with the feeling that, in the present condition of knowledge, the only safe guide to even a tentative arrangement, or a conception of the limits of species, is to be derived from the mature specimens contained in herbaria, our author has accepted these as his material, and reduced or constituted species, and genera, upon that basis. Hence he combines several, so-called, species in *Craterium* and *Badhamia*, and interprets *Arcyria* as including *Hemiarcyria*, and *Stemonitis* as embracing *Comatricha*.



In order to inspire confidence in his determinations the preface gives a general announcement of the sources whence the types were derived, and especially "the splendid collection of Myxogastres in the Royal Herbarium, Kew, rich in types, and with numerous annotations by Rostafinski, who examined the collection in detail, and which, indeed, served as the basis for his excellent Monograph, also served me in like manner."

No one can doubt that Mr. Massee has gone to his task honestly, has worked all the material industriously, and has produced a conscientious volume, whether all his conclusions be accepted or not. There are 32 pages of "introduction," and probably the student will wish that it had been very much longer. There is but little suggestion of theory, and the absolute animal nature of the Mycetozoa is combatted by a few terse paragraphs. The summary is found in a few lines. "Undoubtedly the Myxogastres must be considered as a terminal group, and the very fact of this admission implies a certain amount of differentiation, in fact sufficient to give individuality to the group. I accept De Bary's reasoning as to the origin of the Myxogastres, and as an evolutionist am ready to extend the same reasoning to other groups, as having had a common origin from the lowest forms of life, where, owing to absence of differentiation, the ideas implied in the terms animal and vegetable respectively are not evolved, and I consider that the entire evidence as to the animal or plant tendency of any departure from this neutral starting-point consists of the aggregate tendency of the evolved features, which collectively constitute the characteristics of the group under consideration; and this tendency, as manifested by the Myxogastres, I consider to be in the direction of the vegetable kingdom, and more especially in the direction of the Fungi, for the following reasons, which, keeping in view the fact that we are dealing with a terminal group, and consequently can draw no comparisons from higher forms of the same type, we find it impossible to establish any strict homologies, and we are limited to the observation of resemblances in form, structure, and mode of life."

The nine reasons which follow may be left to be perused and reflected upon by those who use the volume.

Although we do not admire books of this particular size, which hardly harmonize with anything else, it certainly is good, clear reading, and both printer and publisher have done their duty. The coloured plates will be valuable, notwithstanding an amount of hardness and harshness in their execution which does not please the critical eye. We fear that we do not ourselves come up to the orthodox standard of a "reviewer," at least as interpreted practically in certain journals with which we are acquainted. The first, and almost the last, qualification seems to be the search after everything which can be magnified into a fault, and failing to secure sufficient for the purpose to imagine more, interspersed with a flavouring of personality. Our own more humble opinion of our

duty is to estimate the honesty of the work, the value of the volume to those for whom it is intended, and its scientific accuracy up to date. Having estimated this we are not anxious to search with microscopic eye, and bilious intent, for any little slip or error which might perchance be hidden in some obscure corner. Finally, therefore, we commend this volume to such of our readers as are interested in the Myxogastres, in full confidence that it will give them every satisfaction.

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## NEW BRITISH FUNGI.

By M. C. COOKE.

(Continued from p. 95.)

**Valsa (Chorostate) biconica.** *Currey.*

See Grevillea, xx., p. 82.

**Didymella rubitingens.** *Bloxam.*

See Grevillea, xx., p. 82.

**Metasphæria rubida.** *Bloxam.*

See Grevillea, xx., p. 83.

**Myrothecium cinereum.** *Cke.*

Receptacle somewhat cup-shaped, then flattened, discoid or irregular and confluent ( $\frac{1}{2}$  m.m.), gregarious, disc dark cinereous, margin paler, connivent, extreme edge nearly white. Conidia cylindrical, rounded at the ends,  $13-15 \times 3$ , hyaline, on long, simple, fasciculate sporophores.

On pseudobulbs of *Oncidium*. Bot. Gardens, Glasnevin.

**Phoma Delphinii.** *Rabh. in Fiedler's Exs.*

Sporules minute,  $3-4 \times 2 \mu$ .

On stems of *Delphinium consolida*. Norths.

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## MEMORABILIA.

M. CASIMIR ROUMEGUERE.—We regret to learn that the editor of "Revue Mycologique" died on the 29th February, 1892, at the age of 63 years. He has done some good work in his time, and amongst this for fourteen years conducted the "Revue," which he established.

FOMES ZEALANDICUS. *Cooke Grev. VIII., 75. Sacc. Syll. No. 5414.*—This species was derived from Coromandel, in New Zealand, and not from India, as stated in "Sylloge."

FRACCHILÆ BREVIBARBATA, *B. & C., Sacc. Syll. No. 386*, was found on *Acer rubrum* in South Carolina, on bark in Ceylon, and on *Rhus copallina*, Santee Canal, S. Carolina.

POLYPORUS TALPÆ. *Cooke. Sacc. Syll. 5030.*—According to authentic specimen the species named *Polyporus Glaziovii*, Hennings, *Sacc. Syll. Suppl. 693*, is identical with *Polyporus talpæ*, Cooke.

BRESADOLA FUNGI TRIDENTINI.—This work, which was supposed to have been completed with Fasc. vii. and Index, has been resumed with the publication of Fasc. viii.-x., containing plates 106 to 150. We must say that *Morchella costata*, plate 148, hardly commends itself on its artistic merits.

## HANDBOOK OF AUSTRALIAN FUNGI.

We are happy to announce that, concurrently with the issue of the present Journal, the long-anticipated "Handbook of Australian Fungi" will be completed, and bound in one volume, cloth, with gilt tops, containing some 500 pages of letter-press, an introduction, and 36 octavo plates, of which many are coloured, illustrating the genera and sub-genera. Only eighty copies of this work will be retained for sale in Europe and America, for which an early application should be made. The descriptions of the orders, genera, and species are in English, whilst the illustrations are drawn, as far as possible, from Australian species, hence a considerable number are now figured for the first time. The coloured plates are those of the Hymenomycetes, the Gastromycetes, and the Discomycetes. There are upwards of 2,000 species included, with a copious index, and the "introduction" is as full as necessary for the assistance of the student having little previous knowledge of the subject. It is hoped that this first "Handbook" of Colonial Fungi will gratify the Colonists, and give satisfaction to the respective Governments which have combined to assist in its production.

## NEW BRITISH FRESH WATER ALGÆ.

Mr. W. West has recently published, in the "Journal of the Linnean Society," a list of the Fresh Water Algæ of West Ireland; and, in order to keep up a record of the British species in this Journal, we have extracted the new species, exclusive of Desmids and Diatoms, which will probably follow.

**Coleochæte irregularis.** *Prings. Mon. Rabh. Fl. Eur. Alg.* 390.  
*West p.* 108.

Thallus irregular, bright green, threads loosened, or connate in a parenchymatous stratum; joints quadrangular or polygonal, equal in length or  $1\frac{1}{2}$  times as long; oogonia oval, irregularly disposed, for the most part naked.

SIZE. Veg. cell  $12\frac{1}{2}$ -20  $\mu$  diam.

Lough Creggan; Roundstone.

**Edogonium longicolle.** *Nord. Alg. Aq. dulc. Sandv.* 20, t. 2, f. 11-12.  
var. **Senegalense.** *Nord. Alg. et Char.* t. 16, f. 23. *West p.* 109.

*Diæciou, nannandrous* (?). Oogonia 2-3, continuous or single, pyriformly globose, or depressedly globose, basal part elongated, opening by a pore in the middle, or a little above the middle.

Oospores depressedly globose, small males unicellular, inversely egg-shaped, small, seated on the oogonia, basal cell dilated and scutiform below.

SIZE. Veg. cell  $4\frac{1}{2} \mu$  diam., 3 times as long; oogonia  $16-18 \mu \times 18-23 \mu$ ; oospore  $16 \times 11 \mu$ .

In lakes, ditches, etc. Upper Lake of Killarney.

**Ædogonium suecicum.** *Wittr. Mon. Ædog. p. 30. West 109, t. 18, f. 2.*

Oogonia single, globose to elliptical-globose, opening with a median pore; oospores filling the oogonia, globose, spiny with awl-shaped spines; male plants about the same thickness as the female; spermogonia of 2-4 cells, seated in the upper part of the thread, terminal cell obtuse.

SIZE. Veg. cell  $9-14 \mu$  thick, 4 to 6 times as long; oogonia  $32-38 \times 36-40 \mu$ ; oospores (with spines)  $31-37 \mu$  diam.

Ballynahinch.

**Ædogonium pilosporum.** *West Linn. Journ. 1892, p. 109, t. 18, f. 3.*

*Diacious?* Oogonia single, oblong-ellipsoid, inflated, a little produced at each pole; oospores subglobose, membrane thick, and densely pilose with short hairs; basal cell similar to the others.

SIZE. Veg. cell  $11-12 \mu$ , 5-6 times as long; oogonia  $23 \times 48 \mu$ ; oospore, without spines,  $17 \times 18 \mu$ , with spines,  $19 \times 21 \mu$ , membrane of oospore  $2 \mu$ .

Arderly Lough.

The oospores showed indications of an apical operculum, but an open one was not seen.

**Conferva stagnorum.** *Kutz. Wille. Conf. 20, t. 1, f. 12-27, t. 2, f. 50.*

*West p. 111. Microspora (?) stagnorum. Toni. Syll. Alg. 229.*

Tufts yellow-green, becoming paler; cells  $5-9 \mu$  diam., 1-2 or rarely 3-4 times as long; membrane thick in proportion, hyaline; cysts elliptical or subglobose, nearly entirely filling the mother-cell.

SIZE. Filaments  $8\frac{1}{2}-10 \mu$  diam.

Near Westport; Ballynahinch; Upper Lake of Killarney.

**Conferva pachyderma.** *Wille. Conf. 20, t. 1, f. 28-35. West p. 111.*

*Microspora pachyderma. Toni. Alg. p. 228.*

Vegetative cells  $9-12 \mu$  diam.,  $1\frac{1}{2}$  to 3 times as long as broad, with a thick membrane; persistent cells formed without any peculiar modification from the vegetative cells, ellipsoid or subglobose or quadrangular.

Derryclare Lough; South of Kenmare.

**Conferva abbreviata.** *Wille. Con. p. 21, t. 2, f. 58, 59. West p. 111.*

*Microspora abbreviata. Toni. Syll. Alg. 228.*

Tufts floccose, floating, bright green, or for the most part coloured ferruginous ochre; vegetative cells shortly cylindrical, scarcely constricted,  $5-10 \mu$  diam.,  $1\frac{1}{2}$  to 3 times as long, membrane homogeneous, hyaline, a little thickened.

Cloonee Lough.

**Mougeotia elegantula.** *Wittr. Om. Gotl. Sotv. Alg.* 40, t. 3, f. 5-8. *West p.* 112.

Vegetative cells  $4-4\frac{1}{2}$   $\mu$  diam., 15 to 30 times as long, copulating cells knee-shaped; spores 20-24  $\mu$  long and broad, 12-14  $\mu$  thick, cruciform, quadrate in front view, sub-elliptic with truncate apex in side view, mesospore hyaline, even, in front view quadrate, with angles a little rounded, side view oval.

Form. **microspora.** *West Linn. Journ.* t. 18, f. 17.

Vegetative cell 4  $\mu$  thick, 16 times as long. Spore 18  $\mu$ .

Creggan Lough.

**Zygnema leiospermum.** *DBary. Cooke F. W. Algæ* 82.

Form. **minor.** *West in Linn. Journ.*

Sterile cells and zygospores smaller. Vegetative cell 16-17  $\mu$  broad,  $2-2\frac{1}{2}$  times longer. Zygospore 20-23  $\mu$ .

Cloonee Lough.

Form. **megaspora.** *West in Linn. Journ.*

Veg. cell, 27-28  $\mu$  thick, 2-3 times longer. Zygospore 40-45  $\mu$  diam.

Lough Shindilla.

**Zygonium momoniense.** *West Linn. Journ.* 114, t. 24, f. 26.

Sterile cells  $1\frac{1}{2}$ -2 times as long as broad, connective tube much inflated; zygospores broadly elliptical (the long axis parallel to the filaments), membrane smooth.

SIZE. Veg. cell, 20-22  $\mu$  broad; zygospore,  $30-33 \times 25-27$   $\mu$ .

Castletown.

This species differs from *Z. Ralfsii* in its larger size, its shorter sterile cells, and its much larger, differently shaped zygospores.

**Staurogenia heterocantha.** *Nord. in Wittr. et Nord. Alg. Exs.* 451. *West p.* 189. *Toni Syll. Alg.* 656.

Cænobium of four cells, rounded, or broadly ovate-obcordate, angles (external) rounded, furnished with a spine, spines unequal, one (right) long, the other (left) about one-half shorter.

SIZE. Cells 4-8  $\mu$  without spines, with long spines 14  $\mu$ , short spines 8  $\mu$ .

Derryclare Lough.

**Cælastrum verrucosum.** *Reinsch. Cont. Alg. et Fung.* t. 13, f. 8. *West p.* 189. *Toni Syll. Alg.* 572.

Cænobium spherical, composed of 8 to 16 cells, measuring 45-56  $\mu$  diam.; cells spherical, 11  $\mu$  broad, membrane thick, externally covered with acute warts.

Adrigole.

**Oocystis Nägelii.** *Br. in Rabh. Fl. Eur. Alg.* III., 53. *West p.* 191. *Toni Syll. Alg.* 663.

Families composed of 2 or 4 to 8 cells; cells rounded-ovoid or oblong before division,  $30-40 \times 15-21$   $\mu$ ; membrane rather thick, not stratose.

S. of Kenmare.



**Oocystis solitaria.** *Wittr. in Nord. et Wittr. Alg. Exs.* 224. *West p.* 191. *Toni Syll. Alg.* p. 664.

Cells for the most part solitary,  $13-35 \times 7-18 \mu$ , sometimes associated in families of 2 to 4 cells, ellipsoid; membrane rather thick, with a small tubercle at each end.

Clifden.

**Acanthococcus aciculiferus.** *Lager. Bidr. Sver. Alg. Fl. t. 1, f.* 21. *West p.* 191.

Cells solitary, or collected in families, globose or subglobose, rarely oval, of variable size; membrane of the cells thick, densely clothed with very numerous spines.

Diam. without spines  $20 \mu$ , with spines  $26 \mu$ .

Cromagloun.

**Acanthococcus sp.** *West Linn. Journ.* 1892, 191, t. 18, f. 14.

Cells solitary, or conglomerate in small families, globose; membrane of the cells thick, furnished with numerous short, stout spines.

Diam. without spines  $34-42 \mu$ , spines  $3-4 \mu$ .

Burrew Hills, co. Clare.

**Botryococcus calcareus.** *West Linn. Journ.* 1892, t. 18, f. 6.

Thallus small, subglobose, of about 32 cells, free swimming, or aggregate in small masses; cells ovate, wedge-shaped, rather emarginate at the broader pole, with the narrow pole directed to the middle of the thallus.

SIZE. Fam.  $30-55 \mu$  diam. Cells  $9-12\frac{1}{2} \mu$  long,  $10-12\frac{1}{2} \mu$  broad,  $7\frac{1}{2}-10 \mu$  thick.

Amongst *Spirogyra* in small limestone pools. Burrew Hills, Co. Clare.

Differs from *B. Braunii* in the very different shape of the cells, and in not having them so densely packed.

**Scenedesmus alternans.** *Reinsch. Alg. Fl.*

Cells all equal, broadly elliptical to ovate-elliptical, rounded at the poles, twice as broad as long; families composed usually of eight cells, perfectly alternate.

Lough Shannacloontippen; near Oughterard; near Recess; Clifden; Carrantuohill; Adrigole.

**Scenedesmus denticulatus.** *Lagerh. Bidr. Stockh. Pedias. p.* 61, t. 2, f. 13-16. *West p.* 193. *Toni Syll. Alg.* 564.

Cœnobium of four cells, ovate or ovate-oblong, cruciately disposed, or subalternate, rounded at each pole, and furnished mostly with two teeth; membrane rather thick; pyrenoid central,  $7-8 \times 5-11 \mu$ .

Ballynahinch; Lough Shannacloontippen.

var. **lineatus.** *West t.* 18, f. 7.

Cells oblong, narrower, and arranged in one series, not cruciate or alternate, with 2-3 small teeth.

Cells  $10-11 \mu$  long,  $2\frac{1}{2}-4 \mu$  thick.

Derryclare Lough.

**Polyedrium minimum.** *Braun. P. pinacidium. Reinsch. Alg. Fl. p. 80.*

Cells in front view tetragonous, margins straight or slightly repand, angles rounded, obtuse, unarmed; cells from side view elliptical; cells half the thickness of the transverse diameter.

SIZE  $6.9 \mu \times 3.6 \mu$ .

Lakes Clifden to Roundstone; Oorid Lough; Derryclare Lough.

**Polyedrium caudatum.** *Lagerh. Bidr. Sver. Alg. Fl. West. p. 194. P. pentagonum. Reinsch. Alg. t. 3, f. 2.*

Cells pentagonal, margins repand to emarginate, angles obtuse, each armed with a single long, firm, hyaline spine.

Near Westport; Lakes east of Lough Bofin.

**Anabæna (Sphærozyga) orthogona.** *West Linn. Journ., 1892, p. 195, t. 18, f. 8.*

Trichomes nearly straight, dispersed, dissepiments constricted, pale æruginous, joints subquadrate; heterocysts globose; spores twin or single, large, rather rectangular, 3-4 times as long as broad.

SIZE. Veg. cells  $5 \mu$  diam.; heterocyst  $6-7\frac{1}{2} \mu$ ; adult spore  $10-12 \mu \times 30-38 \mu$ .

In peaty pools north of Cromagloun.

The vegetative cells generally appear distinct from each other, being apparently connected by the mucilage; the decidedly truncate spores, which are fully twice the diameter of the vegetative cells, are characteristic.

**Scytonema calotrichoides.** *Kutz. Rabh. Fl. Eur. Alg. II., 253. West p. 196.*

Tomentose-cæspitose, glaucous æruginous, trichomes stout, more or less curved, intricate, distinctly or indistinctly articulate, pseudo-ramuli for the most part in pairs, spreading, variously curved, joints about equal in length and breadth, æruginous, granular, not torulose, terminal often uncoloured, never red; sheaths distinctly lamellose, colourless or spotted with yellow or pale brown; resting cells interspersed, oblong-cylindrical, hyaline.

SIZE. Without sheath  $12\frac{1}{2}-13 \mu$  diam.; with sheath  $17-20 \mu$  diam.

S. of Kenmare.

**Spirulina turfosa.** *Cram. Hedwigia II., 61, t. 12, f. 1. West p. 198.*

Solitary, pallid æruginous, trichomes for the most part abbreviated.

Trichomes  $4\frac{1}{2}-5 \mu$  diam.

Near Westport.

**Merismopædia æruginea.** *Breb. in Rabh. Fl. Eur. Alg. II., 57. West p. 199.*

Thallus somewhat limited and without colour. Families composed of 4-8-64 cells. Cells crowded, contents æruginous.

Cells  $4\frac{1}{2}-6 \mu$  diam.

Lakes Clifden to Roundstone.

**Merismopædia irregulare.** *Lagerh. Bidr. Sver. Fl. Alg. t. 1, f. 5, 6. West p. 199.*

Families large, foliaceous-plicate and convolute, composed of numerous, remote or crowded, irregularly disposed small cells. Contents pale æruginous, not granulose.

Arderry Lough.

**Glaucocystis nostochinearum.** *Ilz. in Rabh. Fl. Eur. Alg. III., Add. p. 147. West p. 199.*

Cells bounded by a hyaline limb, vesicles oblong, pallid, distinctly nucleolate.

Near Lough Brin; Carrantuohill; Glen Caragh.

**Aphanothece [saxicola.** *Näg. Rabh. Fl. Eur. Alg. III., 63. West p. 200.*

Thallus gelatinous, colourless or becoming yellowish; cells sub-cylindrical, two or three times as long as broad, single or in pairs, girt with a loose tegument, contents pale greenish-blue.

Nacoogarrow Lough; Loughs Aunierin and Creggan; Carrantuohill.

## CLADOSPORIUM.

We fail to trace the following in Saccardo's "Sylloge," Vol. iv.:

**Cladosporium apiculatum,** *Berk. in Herb.*

On *Helianthus*. S. Carolina.

**Cladosporium asperococcus,** *Oud. Fungi Gallici 4592.*

**Cladosporium cæspiticiu[m],** *Rabh. Fun. Eur. 579.*

**Cladosporium chætomium,** *Cke.*

On *Euphorbia*. U.S.A. (Ellis 2289).

**Cladosporium diaphanum,** *Thum. Myc. Univ. 1868.*

**Cladosporium dracænatum,** *Thum. Myc. Univ. 1869. Fungi Gall. 4896.*

**Cladosporium epibryum,** *C. & Mass. in Grevillea.*

**Cladosporium Fluggeæ,** *Thum. Fun. Eur. 1571.*

**Cladosporium fungorum,** *Pers. Fun. Gall. 3293.*

**Cladosporium fuscatum,** *Link. Sp., p. 4.*

**Cladosporium fusisporum,** *B. & Curt.*

**Cladosporium gleditschiæ,** *Cke.*

**Cladosporium graminum,** *Link. Sp. p. 43.*

**Cladosporium hirsutum,** *Schwein.*

**Cladosporium jasmini,** *Schwein.*

**Cladosporium microsporum,** *Rabh. Itin. Crypt. 42. Fun. Gall. 1426.*

**Cladosporium obtectum**, *Rabh. Itin. Crypt.* 36. *Fun. Eur.* 2783.

**Cladosporium pelliculosum**, *B. & Curt.*

**Cladosporium solutum**, *Link. Sp. p.* 39.

**Cladosporium subnodosum**, *Cke. Rav. Fun. Amer.* 294.

**Cladosporium subtile**, *Rabh. Fun. Eur.* 2364.

**Cladosporium ulmariae**, *Grog. Fun. Gall.* 3697.

## ENTOMOGENOUS FUNGI.

At length arrangements have been made for the publication of this work, which has been so long delayed. It will bear the title of "Vegetable Wasps and Plant Worms: A Popular History of Entomogenous Fungi, or Fungi Parasitic upon Insects," by M. C. Cooke, with numerous illustrations, uniform with the same author's "Toilers in the Sea." The whole of the letter-press is already in type, and it is only the illustrations which block the way. This is the almost universal "Bogie Man" at which publishers shudder, looking upon the cost as an unknown quantity. Such a work has never been published in this country before, although it has been much inquired after and desired, both by mycologists and entomologists, each of whom have an interest in it, but from different points of view. It is not anticipated that the cost will exceed six shillings, or that its issue will be delayed many weeks.

## NEW ZEALAND FUNGI.

BY M. C. COOKE.

**Xerotus glaucophyllus.** *Cke. & Mass.*

Pilei flabelliformi, tenui, plerumque sublobato, sulcato, glabro, opaco, siccitate atro ( $1\frac{1}{2}$ - $2\frac{1}{2}$  c.m.), margine abrupte recurvo; lamellis paucis, distantibus, latis, acutis, venoso-connexis, pallide lateritiis, siccitate argillaceo-glaucibus. Sporibus globosis,  $6\ \mu$  diam.

On twigs. New Zealand (*Colenso*, 1193).

**Synchytrium melicopidis.** *Cke. & Mass.*

Cellulis perdurantibus aggregatis, subconfluentibus, granuliformibus, violaceis ( $20$ - $25\ \mu$  diam.), vulgo maculis orbicularibus, epiphyllis, atropurpureis insidentibus.

On leaves of *Melicope simplex*. New Zealand (*Colenso*, 1184).

## NEW GENUS OF THELEPHOREI.

The following genus, of which the type was referred provisionally by Berkeley to *Thelephora*, is now proposed, for the reasons stated below :—

*Nov. Gen.* **ALDRIDGEA**, *Mass.*

Resupinate, effused, fleshy, subgelatinous when growing, cartilaginous, or rigid and collapsed when dry; hymenium smooth, even, basidia tetrasporous, spores continuous, smooth, elliptical, coloured.

Allied to *Coniophora* in the large, coloured spores, but distinguished by the subgelatinous consistency when growing. Distinguished from *Thelephora* by the smooth, elliptical spores.

**Aldridgea gelatinosa**, *Mass.*

Broadly effused, rather fleshy, subgelatinous, pallid, becoming collapsed, rigid, and purple-brown when dry; margin determinate; spores elliptical, obliquely apiculate, olive,  $10 \times 6-7 \mu$ .

On sawdust. Extending for several inches, the irregularities of the hymenium being due to the substratum.

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## PERSONAL NOTICE.

In undertaking the responsibility of "*Grevillea*," an endeavour will be made to accomplish the desire expressed by the editor in the first volume; that of describing or recording new discoveries—especially British—in every section of Cryptogamic Botany, also by abstracts and notices, to indicate the results of work done in other countries, biological, morphological, and systematic. The expression of the above statement is justified by the promise of assistance from well-known specialists. Mr. E. A. L. Batters, LL.D., B.A., F.L.S., will take entire charge of the section devoted to *Algæ*. Each number will contain one or two plates, plain or coloured, as occasion may require.

GEO. MASSEE.

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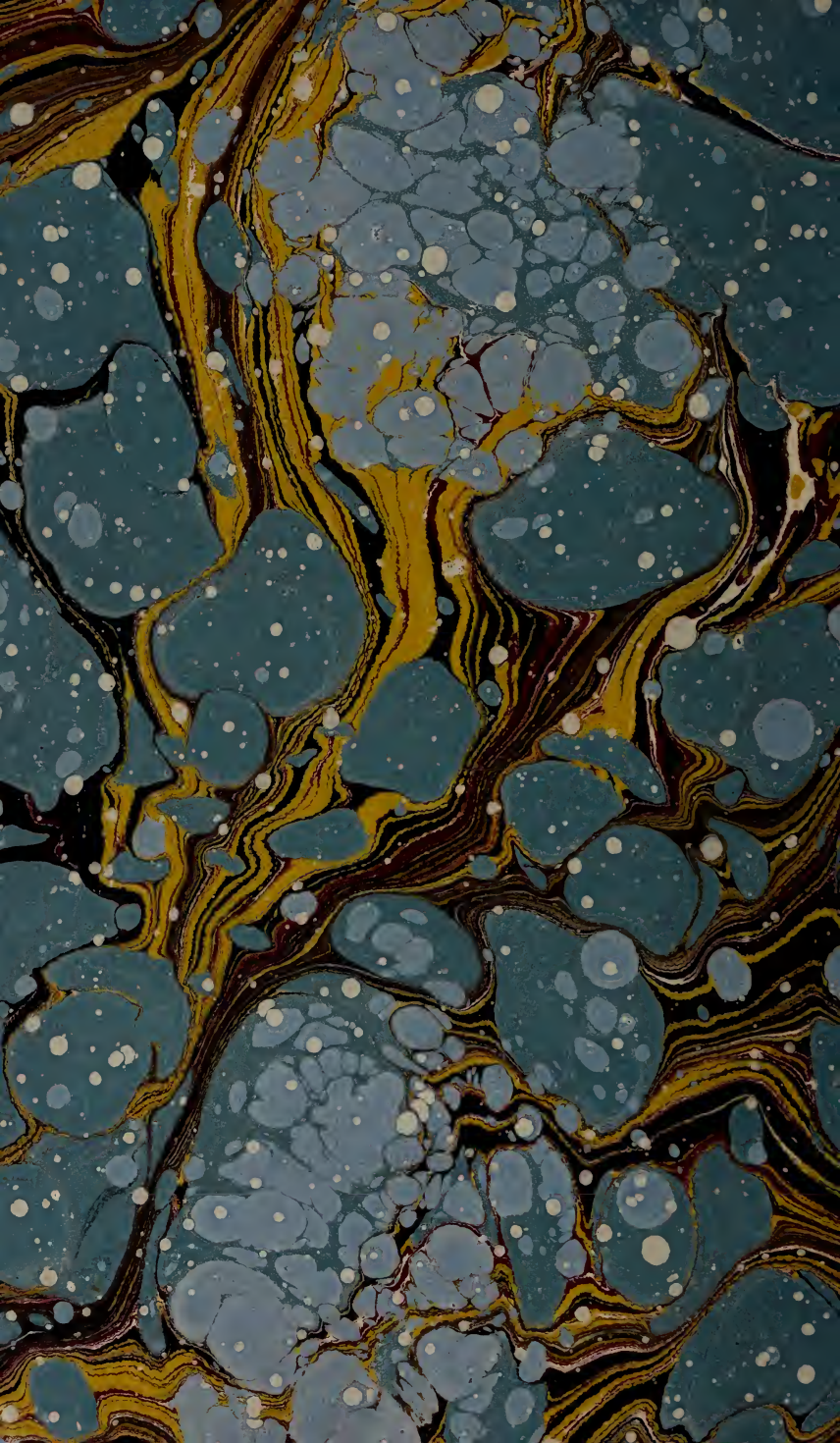
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